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LIST OF CONTRIBUTORS.

- ADKIN, ROBERT, F.E.S., 49, 115, 309
 ALDERSON, MISS MAUDE E., F.E.S., 251
 ANDERSON, JOSEPH, 249, 251
 ARKLE, J., 66, 93, 131, 231, 250, 272, 273
 BAUMANN, R. T., 230
 BAXTER, T., 310
 BELL, S. J., 23, 45, 71, 96, 207, 255
 BELLAMY, CHAS. J., 272
 BENTALL, G. E., F.E.S., 16
 BOGUE, W. A., F.E.S., 201
 BRIGGS, CHARLES A., F.E.S., 71
 BRIGGS, THOMAS H., M.A., F.E.S., 282
 BROCKLEHURST, W. S., 156
 BROWN, HENRY H., F.E.S., 272
 BROWNE, H. B., M.A., 48
 BUCKLE, Major A. S., R.F.A., 7
 BUTLER, W. E., F.E.S., 62
 CAMERON, P., 33, 38, 61, 82, 88, 124, 151,
 192, 234, 285, 290, 295, 299
 CAMPION, F. W., 252, 312
 CAMPION, F. W. & H., 312
 CARDEW, Capt. P. A., R.A., 182, 203,
 229, 311
 CARPENTER, JOSEPH H., F.E.S., 272
 CARTER, J. S., 182, 250
 CHAPMAN, T. A., M.D., F.Z.S., F.E.S., 97,
 153
 COCKATNE, E. A., F.E.S., 17
 COCKERELL, Prof. T. D. A., 34, 59, 84,
 121, 146, 262, 292
 DAY, Rev. ARCHIBALD, 91
 DISTANT, W. L., F.E.S., 15, 36, 147
 DIXON, M. C., 309
 DYKE, F. M., B.Sc., 273
 EDLSTEN, H. M., F.E.S., 250, 311
 EDWARDS, Miss A. D., 272
 EVERETT, Rev. E., 252
 FARN, A. B., F.E.S., 153
 FLEMING, Rev. W. W., M.A., F.E.S., 309
 FOUNTAINE, Miss M. E., F.E.S., 90
 FROTHAWK, F. W., M.B.O.U., F.E.S., 40,
 154, 161, 230, 291
 FRYER, H. F., F.E.S., 86, 110
 GALPIN, SIDNEY H., 183
 GIBBS, A.E., F.L.S., 71, 160
 GIBSON-ROBERTSHAW, G., 89
 GOODWIN, EDWARD, F.E.S., 311
 GRELLET, R. C., 312
 HARRISON, A., F.Z.S., F.E.S., 249
 HEBERDEN, C. L., 182
 HODGE, HAROLD, 228, 230, 271, 272
 HOLMES, D. C., 184
 HOOKER, W. G., 201
 HUGGINS, H., 184
 HUNT, H. E., 250
 JACKSON, F. W. J., 273
 JACOBS, Lieut. J. J., 62, 230
 JACOBY, MARTIN, F.E.S., 26
 JARVIS, W., 251
 KAYE, W. J., F.E.S., 10
 KIRBY, W. F., F.Z.S., F.E.S., 47
 KIRKALDY, G. W., F.E.S., 12, 37, 58, 123,
 188, 265
 KITCHENER, GEO. P., 251
 LADDIMAN, R., 230
 LAWSON, R., 40
 LE CHAMBERLAIN, CHAMPION, 202
 LEIGHT, H. S., 113, 251
 LUCAS, W. J., B.A., F.E.S., 16, 39, 45,
 46, 136, 142, 154, 167, 186, 202, 205,
 208, 270, 279, 280, 308
 LYLE, G. T., 233, 249
 MANNERING, E., 156
 MANSURIDGE, Wm., F.E.S., 43, 70, 112,
 136
 MARTINEAU, ALFRED H., F.E.S., 208
 MATHEW, GERVASE F., Paymaster-in-
 Chief, F.L.S., F.E.S., &c., 310
 MELDOLA, Prof. R., F.R.S., F.E.S., &c.,
 229, 251, 273
 MERRIFIELD, F., F.E.S., 271
 MOORE, F. H., 251
 MORLEY, CLAUDE, F.E.S., &c., 125, 148,
 172, 189, 209, 233, 286
 MORRIS, J. B., 270
 MORTON, KENNETH J., F.E.S., 38
 NEWSTEAD, ALFRED, 19
 NICHOLS, GEO. T., 203
 OLDAKER, F. A., M.A., 157
 PERKINS, V. R., F.E.S., 203
 PESKETT, GUY E. H., 230
 PICKARD-CAMBRIDGE, Rev. O., 156
 POPE, F., 63
 PRIDEAUX, R. M., F.E.S., 55, 130
 PROUT, LOUIS B., F.E.S., 52, 76, 271
 RAVEN, C. E., 218, 231
 RAWLINGS, G. F., 80
 RAYNOR, Rev. G. H., 308
 RAYNOR, HAROLD, 231
 REYNOLDS, EDWARD P., 204
 RICHARDS, PERCY, 19, 232, 311
 ROLLASON, W. A., 18, 19, 41, 102, 131, 273
 ROSA, A. F., M.D., 4
 ROTHSCHILD, Hon. L. W., Ph.D., F.E.S., 1
 ROTHSCHILD, Hon. N. CHARLES, M.A.,
 F.Z.S., &c., 231, 257, 281

ROTHSCHILD, Hon. WALTER, D Sc., M.P., F.L.S., &c., 185	TATCHELL, LEONARD, 230
ROWLAND-BROWN, H., M.A., F.E.S., &c., 21, 42, 68, 75, 90, 94, 133, 156, 159, 257, 272, 277, 296	TAYLOR, CAMPBELL, 228
SHARP, EDWIN P., 205, 271, 310	THEOBALD, FRED. V., M.A., 106
SHARPIN, ARCHIBALD, 89	THORNEWILL, Rev. CHAS. F., 16
SHELDON, W. G., F.E.S., 212, 239, 294, 301	THURNALL, A., 308
SHEPPARD, T., 90	TULLOCH, Capt B., F.E.S., 275
SICH, ALFRED, F.E.S., 230	TURNER, Hy. J., F.E.S., 23, 42, 68, 69, 95, 134, 159, 207, 254, 279, 317
SIMMONDS, HUBERT W., F.E.S., 28	VINAL, HUGH J., 131
SOUTH, RICHARD, F.E.S., 18, 24, 25, 39, 48, 49, 72, 99, 160, 183, 184, 208, 228, 229, 230, 232, 249, 250, 256, 270	WAINWRIGHT, COLBRAN J., F.E.S., 43, 71, 95
SPEYER, E. R., F.E.S., 116, 168	WALKER, J., 310
STANDEN, R. S., F.L.S., F.E.S., 90	WALKER, Commander J. J., M.A., R.N., F.E.S., 206
STEDMAN, SAVIGNAC B., 156	WEDDELL, B., 272
STONELL, BERT S., 182, 183	WHEELER, Rev. GEORGE, M.A., F.E.S., 137, 177, 195, 221, 244, 267, 302
SWEETING, H. R., 43, 70, 136	WIGHTMAN, A. J. C., 41, 203, 204, 228, 231, 271
TAIT, R., 310	WILLIAMS, HAROLD B., 182
TAIT, R. Jun., 308, 310	WINDYBANK, A. J., 312
TARBAT, Rev. J. E., 229, 251	WINNER, HAROLD B., 131
	WOODBIDGE, FRANCIS C., F.E.S., 40

PLATES.

I.—The late Martin Jacoby, F.E.S.	to face	25
II.—Life History of <i>Tortrix pronubana</i>	„	49
III.—Newly-hatched Larva of <i>Papilio homerus</i>	„	97
IV.—Egg-shells of <i>Papilio homerus</i>	„	
V.—Micropyle of the egg of <i>Papilio homerus</i>	„	
VI.—1. <i>Leucophæa surinamensis</i> , Linn.	„	185
2. <i>Decticus verrucivorus</i> , Linn.	„	
VII.—1. <i>Abraxas grossulariata</i> , ab.	„	249
2. „ <i>sylvata</i> (<i>ulmata</i>), ab.	„	250
3. <i>Raphidia notata</i>	„	233
4. Ova of „ „	„	
VIII.—A new Bat-Flea (<i>Nycteridopsylla longiceps</i> , sp. n.)	„	281

ILLUSTRATIONS IN THE TEXT.

<i>Malacosoma neustria</i> , ab.	257
A Fossil Fly (<i>Philorites johannseni</i> , Cockerell)	262

INDEX.

GENERAL.

- Abraxas grossulariata*, ab., 249; *sylvata* (ulmata), 250
 Aberration of *Amphidasys betularia*, 153
 A Correction: *Melitteia parthenie* var. *varia*, 130
Acherontia atropos at Oxford in May, 183; at Ringwood, 272; in Hants, 251; in Hertfordshire, 312; in Inverness, 272; in Kent, 230; in Lancashire, 310; in Middlesex, 272; in Norfolk, 230; in Notts, 251; in Selkirk, 272; in Sussex, 251; in Co. Waterford, 309
Acidalia emutaria in Sussex, 203
Acidalia humiliata reared from ova, 308
Acidalia ossenta, Note on the larva of, 62
Acronycta auricoma at Dover, 311
 Addendum, 41
Aeschna mixta in Sussex, 312
 A Few Notes on Breeding Experiences in 1907, 180
 A Fossil Fly of the Family *Blepharoceridae*, 262 (fig.)
 African Bees, A new subgenus of, 146
 African Bees, New, 121
Agrotis cinerea in Isle of Wight, 310
Agrotis lunigera and *lucerna* in Sussex, 41
Agrotis lunigera in North Wales, 310
Agrotis ypsilon in early July, 203
 A Guide to the Study of British Waterbugs (Aquatia Hemiptera), 37
 American Bees, New, 59
Amphidasys betularia, A new variety of, 112, 153
Amphidasys betularia var. *doubledayaria* in Rutland, 231
 Andalusian Butterflies, Notes on some, 212, 239
Angerona prunaria in September, 278
 An Entomological Visit to North Queensland and Natal, 28
 A New *Pseudagenia* from Sikkim, 38
 A New Species of Bat-flea from Great Britain, 281
 A New Species of *Tremex* (Siricidae) from Borneo, 33
 A New Subgenus of African Bees, 146
 A New Variety of *Amphidasys betularia*, 112, 153
Argynnis paphia var. *valesina* in Gloucestershire, 203
 A Small Collection of Swiss Neuroptera, 270
 Australian *Humolpini*, 26
 Basses-Alpes in August, 257, 296
 Bibliographical and Nomenclatorial Notes on the Hemiptera, 12; No. 8, 123, No. 9, 188
 Bibliographical Notes, On Some Recent, 15
 Bird chased by a Butterfly, 90
Bombyx quereus assembling, 312
 Braconidae, Notes on British, 125, 143, 286
 British Sawflies, 172, 189
 British Waterbugs, A Guide to, 37
 Broadland, A Week in, 218
 Caddis-fly eating Aphides, 153, 228
Calamia phragmitidis in Sussex, 231
 Capture of *Notodonta phœbe* = *trilophus* in Bedford, 156
 Captures at electric light, 19; of Lepidoptera in West Cornwall, 273; at light at Kingston Hill, 311
Caradrina ambigua in Devonshire, 63; in West Cornwall, 272
Caradrina exigua at Chester, 272
Caradrina (*Laphygma*) *exigua*, Notes on, 80
Cerura bicuspis at Chester, 250
 Chalcididae from Borneo, 151
 Chrysididae from Borneo, 61
Cirrhodia xerampelina in Surrey, 311
Cleora glabraria in West Cornwall, 18
 Coleoptera, On Mounting, 86, 110
Colias edusa at Leatherhead, 272; at Swanage, 230; bred in October, 1908, 291; in Cornwall, 271; in Cumberland, 309; in Dorset, 251; in Essex, 229; in Hants, 25; in Herts, 251; in Kent, 251; in Middlesex, 251; in Surrey, 230; in Sussex, 230, 309; near Gravesend, 183; near Norwich, 230
Colias hyale in South Devon, 229
 Conversazione, Ent. Soc. Lond., 154
Cosmia pyralina at Chester, 231
 County Corrections, 232
 Current Notes, 265
 Cynipidae from Borneo, 299

- Dasypolia templi* at Chester, 272
Deilephila euphorbiae at Bournemouth, 204
 Description of a New Form of *Zygæna* from Algeria, 185
 Description of a New Species of *Megachila* from India, 88
 Description of a New Species of *Cryptinae* from Borneo, 290
 Description of a New Species of Sawfly (*Selandria*) from Borneo, 124
 Description of New Genus and Species of *Braconidae* from Borneo, 295
 Description of New Genus and Two Species from Borneo, 299
 Description of New Species of *Ceratina* from Borneo, 285
 Description of Two New Genera and Species of Australian *Eumolpini* (*Coleoptera* *Phytophaga*), 26
 Description of Two New Genera and Species of *Ichneumonidae* (*Xoridini*) from Borneo, 82
 Description of Two New Species of *Chrysididae* from Borneo, 61
 Description of Two New Species of *Evania* from Borneo, 237
Dicycla oo in Richmond Park, Surrey, 231
 Dragonflies for the Cabinet, 142; in 1907, 167; in Hants, 252; on the Norfolk Broads, 811
 Early Stages of American Butterflies Wanted, 16
 Editorial, 49
 Entomological Society of London, 90, 154
Epinephela tithonus paired with *E. hyperanthus*, 249
Epunda lichenea in Sussex, 310
Eupithecia innotata not in Worcestershire, 90
Eupithecia larva on *Pastinaca*: A Correction, 271
 Example of Protective Mimicry in Male *Hepialus humuli*, 89
 Field Notes on British Sawflies, 172, 189
 Foe of Dragonfly-nymphs, 16
 Food of Glow-worm, 153; of the Larva of *Acidalia ochrata*, 16
 Geometrid Notes, 76
Gnophos obscurata var. *mundata*, 227
Gynandrous Agrotis puta, 229; *Bupalus piniaria*, 182
Hemiptera, Bibliographical and Nomenclatorial Notes on the, 123, 188
Herminia derivalis not at Barmouth or Chester, 131
 Heteropterous Metamorphoses, 58
 Huntingdon Dragonflies, 1908, 252
 Hibernation of *Gonepteryx rhamni*, 308
Hyloicus pinastri in the Bournemouth District, 203
Hymenoptera from Borneo, 242
Ichneumon Fly opening Cocoons of *Bryophila muralis*, 16
Ichneumonidae from Borneo, 82
 Identity of two South African *Lycanids*, On the, 10
 Jottings on Aphides taken during 1907 and 1908, 209, 233
Liabia minor in the City, 273
 Larva of *Cirrhoëdia xerampelina*, 156
 Late Emergence of *Eselma cyanea*, 271; of *Agrion puella*, 228
Lepidoptera captured in the Kingston District, Surrey, 19
Lepidoptera from Aden and from the Transvaal, Notes on a Collection of, 7
Lepidoptera in the Salisbury District, 201; of East Sutherland, 131
Leucania vitellina in Sussex, 41; in West Cornwall, 18; in S. Devon, 310
 Life-history of *Lycæna acis*, 161; of *Hesperia paniscus* (*palemon*), 102, 154; of *Tortrix pronubana*, 49
Lycæna arion in the Cotswolds, 201
Lycæna zephyrus var. *lycidas*, 89
Malacosoma neustria, ab., 257 (fig.), 308
Macrothylacia rubi in Winter, 40
Megachile from India, A new species, 88
Melitea aurinia, &c., from Barcelona, 301
Melitea parthenie var. *varia*: A Correction, 130
Melitea, The *Athalia* Group of the Genus, 137, 177, 195, 221, 244, 267 302
Nepticula acetosa in Surrey, 308
Neuroptera, 205; from the South of France, 202; A Small Collection of, 270
 New African Bees, 84, 121
 New American Bees, 59, 292
 New Illustrated Work on Larvæ and Pupæ of British Macro *Lepidoptera*, 40
 New Oriental *Papilionidae*, 1
 Note on *Abraxas sylvata*, ab. 271
 Note on the larva of *Acidalia ossenta*, 62
 Notes from Bérissal during June, 1907, 55
 Notes from the Haslemere District for 1906 and 1907, 157
 Notes from the North-west, 63, 91
 Notes from South-western France, 294
 Notes on British *Braconidae*.---VI. 125, 143; VII. 286
 Notes on *Caradrina* (*Laphygma*) *exigua*, 80
 Notes on Collecting in the Aldershot District, 273
 Note on *Eupithecia togata*, 40
 Note on *Metopsilus* (*Chorocampa*) *porcellus*, 184
 Notes on Spanish Butterflies, 4
 Notes on Some Andalusian Butterflies, 212, 239

Notes on Some Transvaal Mosquitoes, including Two New Species, and a New Variety, 106

OBITUARY:—

- Auld, Henry Alfred, 48
Carrington, John Thomas, 73
Chitty, Arthur John, M.A., F.E.S., 48
Dobrée, Nicholas Frank, 47
Goss, Herbert, F.L.S. F.E.S., 72, 74
Jacoby, Martin, F.E.S., 25
Knaggs, Henry Guard, M.D., 46
Maddison, Thomas, F.E.S., 208
Nicholson, George, F.L.S., 230
Thornthwaite, W. H., 208

Observations on the Life-histories and Bionomics of some Tachinidae, 113

Occurrence of *Acherontia atropos* in Hants, 251; in Notts, 251; in Sussex, 251

Odonata in Germany, 116, 168

On Mounting Coleoptera, 86, 110

On Rearing *Melitaea aurinia* (*Artemis*), 182

On Some Bornean Species of *Trigona* (*Apidae*), 192

On Some Recent Bibliographical Notes, 15

On the Interesting Nature of Heteropterous Metamorphoses, 58

On the Variation of *Pyrrhosoma tenellum* and *P. nymphula*, 38

On Three Undescribed Fossorial Hymenoptera from Borneo, 242

On Two New Genera of Chalcididae from Borneo, 212

Orthoptera in 1907, 186

Ova of *Raphidia notata* (Neuroptera), 233

Oviposition of a Hyperparasite (Chalcid) of *Pieris brassicae*, 249

Papilio camilla, Linnaeus (1764), 282

Papilio homerus, On the Egg and First-stage Larva of, 97

Papilionidae, New Oriental, 1

Palimpsestus (*Cymatophora*) *octogesima* in London, 156

Paramblynotus punctulatus and *ruficeps*, 300

Pieris brassicae in January, 39; larva in January, 62

Plusia moneta at Peterborough, 203; in Northamptonshire, 231

Psephenocampa populi in October, 310

Polia chii at Torquay, 250; in Bucks, 250

Prevalence of *Aretia caia* in 1908, 186

Prevention of Mould in Insects, 16

Prionus coriarius, Linn., at Sugar, 250

Pupæ of *Lycæna arion*, 183, 228

Pygæra anachoreta, &c., in Essex, 250, 272, 310

Pyrausta cardui and the June Rainfall of 1906, 145

Raynor Collection, 18

Recent Bibliographical and Nomenclatorial Notes on the Rhynchota, 36, 147

RECENT LITERATURE:—

The Moths of the British Isles, Series i., by R. South, 23

Accouplement des Œufs, et Amour Maternel des Forficulides, by H. Gâteau de Kerville, 45

The Annals of Scottish Natural History, 45

The Little Naturalist in the Country, by Rev. Theodore Wood, 45

Preliminary Report on the Habits, Life-cycle, and Breeding-places of the Common House-fly (*Musca domestica*), as Observed in the City of Liverpool, by R. Newstead, 46

The Agricultural Journal of India, vol. ii, 71

Memoirs of the Department of Agriculture in India, 72

Bulletins of U.S. Department of Agriculture, 72

Proceedings of the United States National Museum, 72

Papers by John B. Smith, Sc.D., 72

Additions to the Wild Fauna and Flora of the Royal Botanic Gardens, Kew, vi., 96

Annals of Tropical Medicine and Parasitology, vol. 1, No. 3, 136

Dragonflies (*Odonata*) collected by Dr. D. H. Atkinson in Newfoundland, with Notes on some Species of *Somatochlora*, by E. B. Williamson, 136

Copulation of *Odonata* by E. B. Williamson, 136

Dragonflies (*Odonata*) of Burma and Lower Siam, by E. B. Williamson, 136

On Some Earwigs (*Forficulidae*) collected in Guatemala, by Messrs. Schwarz & Barber, by A. N. Caudell, 136

Notas Zoológicas, by R. P. Longinos Navás, S.J., 136

Tricópteros nuevos, by R. P. Longinos Navás, S.J., 136

Neuróptero nuevo de Montserrat, by R. P. Longinos Navás, S.J., 136

A Guide to the Exhibited Series of Insects (Nat. Hist. Mus.), 160

A Natural History of the British Butterflies, by J. W. Tutt, 160

Proceedings of the South London Entomological and Natural History Society, 1907-8, 184

Additions to the Wild Fauna and Flora of the Royal Botanic Gardens, Kew, 208, 230

Nuevo Tricóptero de España, 208

Transactions of the City of London Society for the year 1907, 232

The Senses of Insects, 232

Forest Entomology, 255

- Report of the Lancashire and Cheshire Entomological Society, 1907, 256
 On the Mouth-parts of some Blattidae, by J. Mangan, B.A., 279
 Subfam. Decticinae of Fam. Locustidae, 'Genera Insectorum,' 279
 Subfam. Nyctiborinae of Fam. Blattidae, 'Genera Insectorum,' 279
 Report of the Entomological Society of Ontario for 1907, 230
 British Oak Galls, by Edward T. Connold, F.Z.S., F.E.S., 319
 Diptera Danica, 319
 A Preliminary List of Hertfordshire Diptera, by A. E. Gibbs, F.L.S., & Philip Barrauld, 320
 The Genera of the Tortricidae and their Types, by C. H. Fernald, M.A., Ph.D., 320
 Proceedings of the Hawaiian Entomological Society, vol. i., pt. vi., 320
 Broteria, vol. vii., 320
 Rhodometra (Storria) sacaria in South Devon, 250, 270
 Sales at Stevens's, 17, 18
 Sawfly, New Species from Borneo, 124
 Senta maritima in Sussex, 204, 231
 SOCIETIES:—
 Birmingham Entomological, 43, 71, 95, 207
 City of London Entomological, 23, 43, 70, 95, 207, 254, 318
 Entomological Club, 39, 96, 229
 Entomological Society of London, 19, 41, 67, 94, 131, 153, 205, 275, 314
 Herefordshire Natural History, 71, 159
 Lancashire and Cheshire Entomological, 42, 69, 134
 South London Entomological, 21, 42, 68, 94, 133, 159, 206, 253, 277, 317
 Some Bees collected by Dr. F. C. Wellman in West Africa, 34
 Spanish Butterflies, A few Notes on, 4
 Sparrows as Moth-catchers, 228
 Sphinx convolvuli in Selkirk, 272
 Spring Neuroptera at Bude, 205
 Supplemental Note on Eupithecia, 52
 Surinam Cockroaches at Kew, 39
 Sympetrum vulgatum, 39, 90
 Syrphids killed by Fungus, 308
 Tachinidae, Observations on the Life-histories and Bionomics of some, 113
 Teniocampa stabilis in November, 311
 Teratological Specimens of Melitæa aurinia, 182
 The Aphis-eating Caddis-fly, 228
 The Basses-Alpes in August, 257, 296
 The Entomological Society of America, 129
 The Long Life of Scoliopteryx hatrix, 153, 182
 Tortrix prunibana, Life-history of, 49; on yet another food plant, 309
 Trichoptilus paludum, Z., in East Devon, 89
 VARIETIES:—
 Abraxas grossulariata, 18, 23, 249, 277; sylvata, 22, 250; ulmata, 70
 Acronycta aceris, 96; psi (larva), 278
 Agnades bellargus, 95; corydon, 21, 278
 Amphidasys betularia, 70, 254
 Anthrocera trifolia, 20, 22
 Aphodius scybalarius, 132
 Aretia caia, 70, 254
 Argynnis euphrosyne, 255; paphia, 255, 275; selene, 18
 "Bombyx" quercus, 43
 Callimorpha dominula, 253, 255, 277
 Cæonympha pamphilus, 18, 255
 Diceranura vinula, 278
 Diloba ceruleocephala, 277
 Drepana fulcula, 135
 Dryas paphia, 275
 Ennomos angularia, 96
 Epinephole mnira, 23; jurtina, 279
 Eubolia plumbea, 23
 Eugonia polychloros, 254
 Hesperia comma, 44
 Hylophila prasinata, 95
 Lycæna arion, 202; bellargus, 95
 Macaria liturata, 277
 Malacosoma castrensis, 278; neustria, 68, 255
 Melanargia galatæa, 278; ines, 275
 Melanippe fluctuata, 23; sociata, 95
 Mellinia gilvago, 95
 Nemoria viridata, 254
 Noctua rubi, 277
 Notodonta zizeae (hybrid), 21
 Peronea hastiana, 69
 Pieris brassicae, 70
 Pyrrhosoma nymphula, 22; tenellum, 22
 Rumicia phloas, 254
 Scopelosoma satellitia, 44
 Selenia illustraria, 277
 Smerinthus populi (Gynandro.), 132
 Trichiura cratægi, 279
 Troides haliphron (Gynandro.), 68
 Urbicula comma, 21
 Vanessa urticae, 44
 Zonosoma linearia, 255
 West African Bees, 34
 Winter Brood of Dasychira pudibunda, 62
 Zizera (Cupido) minima in August, 273
 Zygæna filipendulae with light pink spots and hind wings, 249

SPECIAL INDEX.

New Genera, Species, Sub-Species, and Varieties are marked with an asterisk.

APTERA.

hybernica (Præmachilis), 45

COLLEOPTERA.

affinis (Agabus), 43
 affinis (Pyropterus), 276
 *Agetinella, 26
 Alaoeyba, 205
 angelicanus (Trogolinus), 276
 angustus (Dromius), 205
 apicarius (Tricodes), 278
 atricapillus (Demetrius), 110
 *australis (Platycolaspis), 28
 biguttatus (Agrilus), 275
 bipunctata (Coccinella), 234
 bipunctatus (Cryptoccephalus), 316
 bohemannii (Osmius), 94
 boleti (Cis), 149
 cervinus (Dascillus), 132
 childreni (Trictenotoma), 132
 clathrata (Cicendela), 32
 cincticollis (Castus), 316
 circumcinctus (Dytiscus), 253
 conarius (Prionus), 251
 crassiuscula (Aleochara), 277, 278
 cupreus (Harpalus), 316
 dentipes (Donacia), 277
 depressus (Pytho), 314
 desjardinsi (Cryptamorpha), 276
 Dinarda, 208
 Diophtoma, 205
 disjuncta (Cicendela), 32
 distans (Xantholinus), 158
 duboulayi (Lomaptera), 31
 fasciatus (Trichius), 278
 flavicornis (Anistoma), 276
 flavipes (D.), 30
 formicarius (Clerus), 276
 halesis (Sermyla), 94
 hirtulus (Cryptophagus), 276
 insulare (Melitomma), 132
 Lamprigera, 205

laevipennis (Lathrobium), 43
 Leptotyphlus, 205
 linearis (Corticaria), 276
 lovendali (Cryptophagus), 205
 lyonesis (Sunius), 276
 maculicornis (Phyllobius), 94
 massiliensis (Clytus), 278
 Melontha, 132
 micans (Orchesia), 148
 *minuta (Agetinella), 27
 molitor (Tenebrio), 159
 mulleri (Phalacrognathus), 31
 muralis (Sitaris), 67
 noctilucus (Lampyrus), 153
 obscurus (Barnyotus), 94
 Orchesia, 288
 perplexa (Oxyptoda), 276
 *Platycolaspis, 27
 podagrariae (Edemera), 278
 proscarabeus (Meloe), 19
 pubicollis (Atemeles), 316
 rubra (Leptura), 278
 scabriculum (Trachypylus), 67
 scybalarius (Aphodius), 132
 semicincta (Cicendela), 30, 31
 simmondsi (Guhania), 33
 smithi (Endicella), 32
 soutellaris (Cicendela), 129
 strumosa (Lomechusa), 20, 205
 sulcatus (Otiorrhynchus), 94
 tenchricus (Otiorrhynchus), 94
 Trictenotoma, 132
 unguicularis (Agabus), 43
 unistriatus (Bidessus), 253
 urticae (R.), 94
 variabilis (Chorimys), 314
 vulpinus (Dermestes), 43

DIPTERA.

africanus (Mansonina), 135
 anale (Spogostylum), 129
 Apistomyia, 263
 atramentaria (Rhizophora), 276
 Bibiocephala, 263
 borussica (Hydrotea), 45
 brassicaria (Ocyptera), 315

calopus (Stegomyia), 135
 cinereus (Pyretophorus), 107
 *circumluteola (Banksiella), 107
 costalis (Pyretophorus), 106, 107
 defuncta (Diceranomyia), 129
 dissimilis (Culex), 106, 107
 domestica (Musca), 113

fasciata (Stegomyia), 135
 funesta (Myzomyia), 107
 Hamuntorhina, 263
 hirsutipalpis (Culex), 107
 *inconspicuus (Edecs), 109
 *inornata (Ficalbia), 198
 jejuna (Ochromyia), 133
 johannseni (Philorites), 262, 264
 lavarum (Tachina), 71
 *longiceps (Nycteridopsylla), 281
 lugubris (Hydrotea), 45
 luteolateralis (Banksiella), 107
 magnus (Campsicnemus), 71
 mauritanus (Myzorhynchus), 107
 mediolineata (Etioreptomyia), 106
 melanocephala (Phyto), 276
 melanopsis (Platycheirus), 71
 oleracea (Tipula), 92

pentactenus (Nycteridopsylla), 281
 *Philorites, 262, 264
 Philorus, 263
 ribesii (Syrphus), 212, 234
 rosii (Myzomyia), 135
 rotundatum (Gymnosoma), 315
 scabiei (Epidapus), 67
 scalare (Melanostoma), 276, 308
 simpsoni (Culex), 106
 spatulipalpis (Theobaldia), 107
 stabulans (Cyrtoneura), 22
 squamosa (Cellia), 107
 sylatica (Masicere), 115
 tenax (Eristalis), 45
 tibialis (Pelatachina), 115
 tigris (Culex), 106
 tigrina (Caricea), 133

HEMIPTERA.

aceris (Chaitophorus), 235
 æneus (Eysarcoris), 253
 agilis (Lachnus), 236
 alacaris (Diceroprocta), 14
 albiseptus (Tynacantha), 124
 alni (Pterocallis), 236
 ancilla (Herrera), 15
 augur (Leptocoris), 15
 *Austromalaya, 124
 avellanæ (Siphonophora), 210
 arundinis (Hyalopt.), 235
 atriplicis (Aphis), 234
 baccarum (Dolycoris), 58
 bicoloripes (Phoneurgates), 265
 betula (Cimex), 59
 betulicola (Callipterus), 235
 bifasciata (Lamprophara), 14
 bifidus (Podisus), 124
 bimaiculata (Chremistica), 14
 *Boria, 124, 148
 boops (Nabis), 254, 277
 brassicæ (Aphis), 233
 cærulescens (Gedipoda), 278
 capito (Globiceps), 12
 capræ (Siphocoryne), 212
 *cardui (Monanthia), 59
 caricis (Cyrtorrhinus), 254
 castaneæ (Callipterus), 236
 caucasica (Cicadetta), 13
 cerasi (Myzus), 211
 cervina (Orthostira), 253
 cocksii (Salda), 254
 contortuplicata (Corixa), 15
 corni (Schizoneura), 237
 coryli (Callipterus), 235
 crategi (Aphis), 233
 curtisii (Eulecanium), 14
 Drepanosiphum, 211, 235
 edentula (Aphis), 234
 epilobii (Aphis), 234
 fabricii (Eysarcoris), 59
 fagi (Phyllaphis), 236

flavida (Platylomia), 14
 fœniculi (Siphocoryne), 212
 formicaria (Forda), 237
 fuliginosa (Schizoneura), 237
 galcopsidis (Phorodon), 211
 *Glaucias, 124
 granaria (Siphonophora), 210
 grisea (Elasmucha), 59
 hedera (Aphis), 234
 hieracei (Aphis), 234
 hieracii (Siphonophora), 210
 humuli (Phorodon), 211
 interstinctum (Acanthosoma), 59
 irrorata (Corixa), 14
 jacobæ (Aphis), 235
 juglandicola (Pterocallis), 236
 juniperina (Pentatoma), 59
 laburni (Aphis), 235
 lanigera (Schizoneura), 93, 237
 laticis (Chermes), 237
 lectularius (Climacoris), 266
 Leptocoris v. Serinetha, 15, 123, 147
 leucomelas (Chaitophorus), 235
 loucopterus (Blissus), 72
 ligustri (Rhopalosiphum), 212
 lincolatus (Podisus), 124
 macrocephala (Lachnus), 236
 mali (Aphis), 234
 malvæ (Aphis), 234
 marginella (Cercopis), 15
 marginella (Cicada), 15
 marginella (Herrera), 15
 melanocephalus (Eysarcoris), 59
 millifolii (Siphonophora), 210
 minutissima (Sigara), 253
 montana (Cicadetta), 253
 *Montronzierellus, 124
 nymphæ (Rhopalosiphum), 212
 oleracea (Lepyrodema), 14
 ornata (Strachia), 278
 papaveris (Aphis), 235

pastinacae (Siphocoryne), 212
personatus (Reduvius), 266
**Phleopphana*, 123
pini (Iachnus), 236
pinicollis (Iachnus), 236
pisi (Siphonophora), 210
plebeja (Cicada), 14
prasina (Cicadetta), 13
pruni (Aphis), 234
**Psalmocharias*, 124
pteridis (Bryocoris), 251
punctipennis (Apateticus), 124
pygmaeus (Cyrtorrhinus), 254
pyri (Aphis), 235
quercus (Callipterus), 235
radicum (Aphis), 236
ribis (Myzus), 211
ribis (Ithopalosiphum), 211
roboris (Dryobius), 237
rosae (Siphonophora), 210
rubi (Siphonophora), 210
rumicis (Aphis), 235
salicivorus (Chaitophorus), 235
sambuci (Aphis), 235
scabiosae (Siphonophora), 210

senria (Idiocerus), 277, 278
sonchi (Siphonophora), 211
spinosa (Cosmopsaltria), 14
stevensi (Cicada), 14
stevanii (Cicada), 14
strigipes (Mincus), 124
subapicalis (Cicadetta), 14
subteranea (Aphis), 234
tanacetii (Siphonophora), 210
theivora (Helopeltis), 72
tiliae (Pterocallis), 236
Tripanda, 148
tioglodyles (Trama), 236
tussilaginis (Siphonophora), 210
ulmi (Schizoneura), 237
urticae (Siphonophora), 210
urticarum (Aphis), 210, 234
verbasci (Cimex), 58
viburni (Aphis), 235
viciae (Megoura), 211
viminalis (Iachnus), 236
viridis (Chremistica), 11
vittipennis (Podisus), 124
vulgaris (Blepharidea), 113, 114
xylostei (Siphocoryne), 212

HYMENOPTERA.

abdominalis (Nematus), 176
abdominator (Meteorus), 126, 149
accinctus (Euphorus), 287
acuminatus (Nematus), 176
adunca (Osmia), 59
aethiops (Eriocampoides), 191
aethiops (Perilitus), 289
albicornis (Meteorus), 126
albiditarsis (Meteorus), 125, 127
albipennis (Pachynematus), 190
albipes (Monophadnus), 192
**Allostomus*, 83
alvi (Hemichroa), 175
alpina (Hypocampa), 191
alternipes (Blennocampa), 191
**amabilis* (Nomia), 85
Amblynotus, 300
angularum (Megachile), 292
annulipes (Eriocampoides), 191
apicalis (Euphorus), 288, 289
apicalis (Pachynematus), 190
assimilis (Blennocampa), 192
aterrima (Phymatoceros), 191
atrator (Meteorus), 126, 149
aureolus (Halictus), 35
autumnalis (Eupoeus), 60
baltentus (Pamphilus), 173
berberidis (Andrena), 293
bergmanni (Pteronus), 177
betulae (Pristiphora), 190
betaleti (Perilitus), 289
bicometes (Diagozonus), 85
**bidens* (Pseudagenia), 38
bilineatus (Meniscus), 70
blmaculatus (Meteorus), 150

bipartita (Pontania), 176
borealis (Vespa), 129
borneanum (Hedychrum), 61
boylei (Panurginus), 293
Bracon, 295
brevicollis (Perilitus), 289
brevivalvis (Pteronus), 177
bucconis (Ashmeadiella), 61
caerulea (Anthophora), 122
caerulescens (Argo), 171
caeruleus (Sirex), 174
caespitum (Tetramorium), 237
calcitrator (Collyria), 173
caligatus (Meteorus), 125, 128
campanulae (Megachile), 292
canifrons (Trigona), 192, 194
caprem (Pachynemata), 190
carpenteri (Lygocerus), 210
cerealium (Perilitus), 289
Chelonus, 295
chiyakensis (Mesotrichia), 34
chrysophthalmus (Meteorus), 125, 128
cimbicis (Spilocryptus), 174
cinctellus (Meteorus), 127, 150
cinctipes (Ixetastes), 128
clematidis (Sphecodes), 60
Clepticus, 83
clitellatus (Pachynematus), 190
coactus (Euphorus), 287
coarctata (Eumenes), 316
caerulescens (Osmia), 17
collina (Trigona), 192
columba (Tremex), 174
combusta (Gronoceras), 35
compressicornis (Lygaonematus), 190

- confinis (Meteorus), 126, 148
 conuata (Cimbex), 174
 consimilis (Cedichneumon), 17
 consobrinus (Nematus), 176
 consors (Meteorus), 126
 conterminus (Microctonus), 289
 convolvuli (Anthophora), 122
 *copelandica (Osmia), 59
 *cosmiocephala (Ceratina), 285
 crassicornis (Pachynematus), 190
 cratagi (Hoplocampa), 191
 *Creightonella, 116
 creightoni (Halictus), 122
 crocea (Henicohra), 175
 cultus (Microctonus), 290
 curtispinus (Pteronus), 177
 cyanocrocea (Arge), 174
 decoloratus (Meteorus), 150
 deceptor (Meteorus), 123, 128
 denticulata (Ashmeadiella), 61
 *dentipleuris (Crabro), 243
 depressus (Pamphilus), 173
 diabolica (Vespa), 129
 *didirupa (Panurginus), 293
 *domicola (Anthophora), 121
 drewsoni (Trichocampus), 175
 dubius (Tomostethus), 191
 duplex (Sirex), 174
 *Elemba, 151
 elfrona (Megachile), 89
 *ekuivensis (Anthophora), 121
 Epistenia, 151
 Epixorides, 83
 erythrocephala (Allotria), 212
 erythrogaster (Trigona), 193, 194
 *erythronota (Pentachalcis), 152
 *erythrostoma (Trigona), 193
 Euphorus, 287
 Eustalocerus, 286
 exilis (Megachile), 292
 falciger (Perilitus), 289
 fallax (Amauronematus), 189
 fasciata (Abia), 174
 femorata (Cimbex), 174
 ferruginea (Hoplocampa), 191
 filator (Meteorus), 127, 150
 filiformis (Calamcuta), 173
 flavescens (Mesotrichia), 34
 flavistigma (Trigona), 193
 flaviventris (Neurotoma), 173
 flavus (Lasius), 236
 fortipes (Pachybracon), 295
 fragilis (Meteorus), 127, 150
 fuliginosus (Tomostethus), 191
 fulvipes (Euphorus), 288
 fulvipes (Pachynematus), 190
 *fulvipilosella (Trigona), 193, 194
 fuscipes (Arge), 174
 *fusco-balteata (Trigona), 193, 194, 195
 *geigeriæ (Ceratina), 35
 *geigeriæ (Halictus), 35
 geniculatus (Monophadnus), 192
 gigas (Sirex), 45, 173, 174
 glomeratus (Apanteles), 249
 granarius (Aphidius), 211
 Hawkeria, 287
 *hewittii (Chrysis), 61
 *hewittii (Crabro), 243
 *hewittii (Evania), 238
 *hitei (Epeolus), 60
 hortensis (Pteronus), 177
 hortorum (Pamphilus), 173
 hotoni (Halictus), 35
 ianthoptera (Megachile), 147
 ictericus (Meteorus), 126, 148
 illusor (Exetastes), 128
 inconstans (Mesotrichia), 34
 insularis (Tremex), 34
 intactus (Euphorus), 288
 jaculator (Meteorus), 126
 *juncundus beugnelliensis (Halictus), 121
 juli (Xyela), 173
 juvenex (Sirex), 21, 173, 255
 kollari (Cynips), 191
 *kuchingensis (Evania), 237
 kuchingensis (Selandria), 124
 lacteifasciata (Trigona), 193
 lacteipennis (Perdita), 294
 lætatorius (Bassus), 235
 læviventris (Meteorus), 127, 150
 laricis (Lygmonematus), 190
 latibalteata (Trigona), 193
 latipes (Cræsus), 176
 latreillei (Trichiosoma), 174
 *lautipennis (Sphæcodes), 60
 Lethulia, 83
 leucosticta (Pontania), 176
 leucotrochus (Pteronus), 176
 leucozonius (Halictus), 122
 *levicollis (Elemba), 151
 limacina (Eriocampoides), 191
 linearis (Macrocephalus), 173
 lineola (Ceratina), 35
 lucorum (Trichiosoma), 174
 luridiventris (Leptocercus), 175
 luridus (Meteorus), 127
 luteiventris (Tomostethus), 191
 luteus (Nematus), 176
 maculata (Nomia), 85
 maculatus (Halictus), 122
 *maculiseutis (Allostomus), 84
 *maculiseutis (Paraxylophurusa), 83
 mandibulata (Megachile), 147
 *marginicollis (Psen), 243
 melanaspis (Pteronus), 177
 melanocephala (Periclista), 191
 melanopoda (Kaliosphinga), 192
 melanostictus (Meteorus), 126, 119
 Microctonus, 287, 289
 micropterus (Meteorus), 127
 miliaris (Pteronus), 177
 *mitimia (Megachile), 146
 mitis (Euphorus), 287
 modesta (Mesotrichia), 86
 monogyniæ (Micronematus), 176
 morbillosus (Halictus), 122
 murinus (Meniscus), 128
 mysotidis (Pteronus), 177

- *myroni (Colletes), 293
 nana (Scolioneura), 192
 nemoralis (Bassus), 234
 *nivevilli (Megachile), 88
 niger (Lasius), 235
 *nigra (Palmerella), 291
 nigrans (Tomostethus), 191
 nigricans (Dineura), 175
 nigricans (Fenusa), 192
 nigrifrons (Colletes), 293
 nigripes (Nomia), 85
 nigripes (Pterophora), 191
 nigrita (Fenella), 192
 nigrocineta (Gronoceras), 35
 nigrocineta (Megachile), 35
 nitidulus (Formicoxenus), 207
 noctilio (Sirex), 173, 174
 obductus (Pachynematus), 190
 obfuscatus (Meteorus), 126, 148
 Oligotropus, 292
 oligospilus (Pteronus), 177
 opacus (Halictus), 36
 opaci (Mesoneura), 191
 ornitipes (Panurginus), 293
 ornatus (Euphorus), 288
 *orthosiphonis (Mesotrichia), 86
 *Pachybracon, 295
 padi (Priophorus), 175
 pallidipes (Cephus), 173
 pallidipes (Euphorus), 287, 288
 pallidipes (Meteorus), 126, 148
 pallidipes (Pristiphora), 190
 *pallidistigma (Trigona), 193, 195
 pallidiventris (Peristiphora), 190
 pallidus (Meteorus), 126
 *Palmerella, 290
 *Paramblynotus, 299
 *Paraxylophorus, 82
 parvidus (Pteronus), 177
 parvulus (Euphorus), 288
 pectinicornus (Cladius), 175
 pectoralis (Hyplocampa), 191
 *Pentachalcis, 152
 Perilitus, 287, 289
 persuasoria (Rhyssa), 174
 picipes (Euphorus), 287, 288
 piercei (Panurginus), 291
 pilipes (Anthophora), 67
 pilosulus (Collyria), 173
 pini (Lophyrus), 175
 plagiator (Ephedrus), 210
 polysophilus (Pteronus), 177
 productus (Halictus), 85
 productum (T.), 85
 profligator (Meteorus), 127
 prolongata (Xiphydria), 173
 proxima (Pontania), 176
 Pseudochalcis, 152
 pulchricornis (Meteorus), 126, 149
 pumila (Entodecta), 192
 *punctulatus (Paramblynotus), 300
 punctiventris (Meteorus), 126, 149, 150
 pusilla (Blennocampa), 191
 pygmaea (Fenusa), 192
 pygmaeus (Cephus), 173
 quadrifasciata (Anthophora), 121
 quadrimotatus (Halictus), 36
 quereus (Pristiphora), 190
 rosae (Arge), 174
 ribesii (Pteronus), 176
 rufa (Osma), 17
 rufa (Formica), 160, 207, 208, 316
 rubens (Meteorus), 127, 150
 ruficeps (Paramblynotus), 300
 ruficornis (Pristiphora), 190
 rublicornis (Hyplocampa), 191
 rutilus (Perilitus), 289
 saliceti (Cryptocampus), 176
 salicis (Pteronus), 176
 salicis (Pontania), 176
 sanguinea (Formica), 160, 205, 208
 satyrus (Macrocephalus), 173
 secalis (Perilitus), 289
 *semicixilis (Megachile), 292
 septentrionalis (Crocus), 176
 sericea (Abia), 174
 sexdentata (Megachile), 147
 sexnotatus (Halictus), 36
 scutellaris (Nomia), 85
 scutellator (Meteorus), 127, 149
 silvatica (Trichiosoma), 174
 similis (Euphorus), 287
 solskyi (Stigmus), 234
 splendidus (Microctonus), 290
 stilata (Dineura), 176
 Strebloccera, 286
 strenuus (Perilitus), 289
 subbifida (Pristiphora), 190
 *subcixilis (Megachile), 292
 sucata (Ardia), 191
 sulcata (Ceratina), 85
 sylvarum (Pamphilus), 173
 tabidus (Meteorus), 126, 129
 tabidus (Trachelus), 173
 tarsatorius (Bassus), 211, 234
 tonellus (Meteorus), 127, 150
 tenuicornus (Blennocampa), 192
 testaceator (Zebe), 127
 *testaceinerva (Trigona), 193, 195
 testaceus (Microctonus), 290
 trisignatus (Pachynematus), 190
 tristis (Priophorus), 175
 tuberculifer (Euphorus), 287
 turgidis (Pachynematus), 190
 ulmi (Kaliosphinga), 192
 unicolor (Meteorus), 127, 149
 ustula (Arge), 174
 vagans (Phyllotoma), 190
 vagus (Pachynematus), 190
 variipes (Eriocampoides), 191
 varus (Crocus), 176
 verna (Dineura), 191
 versicolor (Meteorus), 127, 149, 150
 vexator (Meteorus), 126
 vicini (Scolioneura), 192
 viduatus (Amauronematus), 189
 viminalis (Pontania), 176
 viminalis (Trichocampus), 175

violacea (Xylocopa), 21
 virescens (Halictus), 122
 virescens (Pteronotus), 177
 viridiceps (Tremex), 33
 vitatus (Amauronematus), 189
 wellmani (Thrinchostoma), 84

wesmaliæ, 287
 westoni (Pristophora), 190
 xanthocarpus (Pachyneuratus), 190
 xanthocephalus (Microctonus), 290
 Xylophrurus, 83

LEPIDOPTERA.

abietella (Dioryctria), 256
 absinthata (Eupithecia), 278
 acacie (Thecla), 259, 298
 acmicta (Melachrotis), 10
 accoriana (Hedya), 133
 aceris (acronycta), 96
 aceris (Neptis), 206
 acetosæ (Neptulæ), 254, 308, 318
 achilleæ (Zygæna), 135, 260
 achine (Pararge), 278
 acis (Lyceus), 161
 acontias (Acraea), 9
 actæa (Satyrus), 261, 296, 299
 actæon (Thymelicus), 258, 298
 ada (Cynthia), 30
 adinensis (Hesperia), 9
 adippe (Argynnis), 5, 22, 206, 258, 274,
 297, 298
 admetus (Lyceus), 6, 21
 admola (Nuranga), 10
 adrasta (Pararge), 258, 299
 adusta (Hadena), 136
 adustata (Ligdia), 157
 advenaria (Epione), 157
 adyte (Erebia), 315
 ægeus (Papilio), 28
 ægon (Lyceus), 71, 91
 ægon (Plebius), 21, 159
 ællo (Eneis), 278
 æscularia (Anisopteryx), 63, 133
 æsculi (Z.), 229
 æthiops (Erebia), 5, 258, 277, 299
 agamemnon (Papilio), 30
 agathæ (Neptis), 32
 agathina (Agrotis), 93, 149, 275, 310
 agathina (Mylothris), 8, 9, 31
 agestis (Aricia), 68, 133
 agestis (Lyceus), 92
 agestis (Polyommatus), 216
 aglaia (Argynnis), 150, 203, 206, 230
 254, 274, 277, 298, 317
 agroptera (Melitæa), 141
 alba (Colias), 206
 albescens (Troides), 1
 albicans (Lyceus), 6
 albicillata (Melanthia), 157
 albicincta (Junonia), 29
 albicostana (Peronea), 23
 albipuncta (Leucania), 273
 albipunctella (Tinea), 134
 albistrana (Peronea), 69
 albulata (Emmelesia), 65
 albulalis (Nola), 131, 318
 alchymista (C.), 312

alcimeda (Harna), 33
 aleiphron (Chrysophana), 56, 206, 262,
 298
 aleippoides (Danaïs), 9
 aleippus (Danaïs), 317
 aleyona (Satyrus), 7, 253, 299
 alecto (Erebia), 299
 alexandor (Papilio), 261
 alexandria (Troides), 67
 alexis (Lyceus), 92
 alexis (Polyommatus), 56, 258, 294, 297,
 298, 301
 alimena (Hypolimnas), 30
 aliona (Satyrus), 258, 299
 allous (Polyommatus), 56
 alniaria (Emmomo), 21, 43, 311
 alpina (Aricia), 68
 alpina (Lyceus), 68
 althæa (Carcharodus), 261, 298
 alveus (Hesperia), 57, 215, 260, 261, 298
 amasis (Dionychopus), 10
 amathusia (Brenthis), 57, 259, 298
 amazoula (Areta), 33
 ambigua (Caradrina), 18, 63, 80
 ambigua (Scoparia), 91
 amphitrite (Heliconius), 317
 amytis (Arhopala), 29
 anacardi (Salanus), 32, 134
 anachoreta (Pygma), 250, 272, 310
 andreniformis (Agrotis), 22, 278
 andreniformis (Sesia), 70, 158, 159
 andromache (Acraea), 28
 angularia (Emmomo), 96, 311
 angustana (Eupacilia), 91
 angustiorana (Batodes), 68
 annularis (Agrotis), 10
 antalus (Dendrox), 33
 antalis (Viradola), 8, 9
 *antileuca (Troides), 3
 antiopa (Euanassa), 295, 301
 *antiopa (Troides), 2
 antiopa (Vanessa), 44, 57, 277
 antiqua (Orgyia), 159
 apennina (Lyceus), 315
 apiciaria (Epione), 43, 274
 apollo (Parnassius), 56, 258, 278, 298
 aprilina (Agriopsis), 44, 157
 arborifera (Monas), 10
 arborum (Baniana), 10
 arcana (Cononympha), 57, 258, 299
 arcella (Tinea), 134
 archesia (Precis), 9
 areola (Xylocampa), 133
 arethusa (Hipparchia), 261, 299

- argentata (Carcinopodia), 10
 argiades (Elyceres), 132, 294, 314, 316
 argiades (Lycæna), 161
 argillacearia (Gnophos), 227
 argiolus (Celastrina), 160, 278, 316
 argolus (Cyaniris), 157, 261, 271, 291, 298
 argiolus (Lycæna), 65, 271
 argus (Lycæna), 7, 157
 argus (Plebius), 21, 159
 argus (Rusticus), 55, 261, 298
 argyrognomon (Rusticus), 55, 258, 298
 *ariadne (Troides), 2
 arion (Lycæna), 66, 161, 183, 201, 228, 262, 278, 318
 *arinnus (Troides), 1
 arsilache (Brenthus), 250, 298
 artaxerxes (Lycæna), 68
 artaxia (Precis), 133
 artemis (Melitæa), 22, 182
 arundineta (Nonagria), 204, 205, 270, 271, 316
 *ascarlia (Troides), 2
 ashworthii (Agrotis), 66, 92, 159
 asiatica (Troides), 2
 asteria (Melitæa), 177, 200, 221, 222, 244, 248, 268, 303, 304
 astorion (Papilio), 206
 astrarche (Ariene), 68, 95, 133
 astrarche (Lycæna), 95, 271
 astrarche (Polyommatus), 56, 298
 asylus (Azygophleps), 10
 atalanta (Pyrameis), 57, 251, 295, 299
 atalanta (Vanessa), 57, 206, 230
 Stella, 20
 athalia (Melitæa), 42, 57, 138, 178, 196, 197, 199, 222, 226, 246, 267, 268, 302, 304
 athalia minor (Melitæa), 140
 *atlas (Troides), 1
 atonaria (Eumalurga), 91
 atrata (Tanagra), 206, 318
 atrebatensis (Vanessa), 44
 atropos (Acherontia), 10, 183, 230, 251, 272, 273, 309, 310, 312
 attenuata (Nemoria), 10
 aurantiaca (Papilio), 217
 aurata (Cidaria), 78
 aurata (Eutelephria), 78
 aurelia (Melitæa), 57, 94, 139, 195, 222, 223, 227, 245, 246, 267, 302, 304
 auricoma (Acronycta), 311
 aurifodine (Rigema), 10
 aurinia (Melitæa), 22, 68, 138, 182, 227, 294, 301, 315
 auroraria (Hyria), 21
 australis (Aporophyla), 255
 australis (Dolenschallia), 29
 autumnaria (Ennomos), 21, 42
 autumnata (Oporabia), 44
 auxo (Teracolus), 32
 bacoti (Gorgopis), 10
 bactra (Thecla), 11
 badiata (Anticlea), 65, 159, 206
 bajularia (Phorodesma), 66
 ballus (Thestor), 301
 *bandensis (Troides), 2
 basilarchia, 20, 21
 basilinea (Apanaea), 157
 batia (Thyatra), 157
 baton (Lycæna), 7
 baton (Polyommatus), 55, 239, 258, 261, 294, 298
 beatricella (Lozopera), 17
 belemia (Anthocharis), 213, 214, 215, 217, 242
 belgaria (Scodion), 91
 belia (Anthocharis), 214, 215, 301
 bellargus (Agriades), 21, 95, 232, 253
 bellargus (Lycæna), 95, 311, 315
 bellargus (Polyommatus), 56, 261, 298, 317
 bellera (Thecla), 11
 bellezina (Anthocharis), 214
 bellidice (Pontia), 215
 beon (Papilio), 11
 bergmanniana (Dictyopteryx), 254
 berisalensis (Melitæa), 142, 197, 198, 199, 200, 222, 224, 226, 246, 247, 248, 269, 303, 304
 berisalii (Melitæa), 197, 200
 betula (Ruralis), 160, 318
 betula (Zephyrus), 56, 160, 297
 betularia (Amphidasys), 66, 70, 112, 181, 134, 153, 207, 231, 254
 bibulus (Lachnocæna), 9
 bicolorana (Hylophila), 157, 274
 bicolorata (Melanthia), 69
 bicolorella (Coleophora), 19, 22
 bicostella (Pleurota), 91
 bicuspis (Cerura), 22, 250
 bicuspis (Dicranura), 21, 44, 254, 318
 bidentata (Odontoptera), 65, 131, 254
 bifida (Cerura), 317
 bilinea (Grammosia), 318
 bilineata (Camptogramma), 69, 255, 318
 bilunaria (Selenia), 131
 bimaculata (Bapta), 157
 binaria (Drepana), 157, 274
 bipunctata (Senta), 204
 biundularia (Tephrosia), 64, 134
 botica (Polyommatus), 9
 botica (Zygæna), 216
 boticus (Lampides), 6, 217, 297, 298
 boisduvali (Crenis), 32
 boisduvaliana (Terias), 9
 bolina (Hypolimnas), 28
 bombyliiformis (Hemaris), 274
 bondii (Tapinostola), 23, 32, 279
 boopis (Junonia), 9
 boreata (O.), 77
 borussia (Lycæna), 315
 brachydaetylus (Pterophorus), 70
 bractea (Plusia), 21
 brassica (Pieris), 39, 62, 70, 249, 294, 298, 301, 317
 brasidas (Papilio), 32
 bredowi (Adelpha), 20

- brevilinea (Leucania), 219, 220, 314, 318
 brigitta (Terias), 9
 briseis (Hipparchia), 258, 299
 briseis (Satyrus), 7, 299
 britomartis (Melitea), 94, 178, 180, 223,
 227, 246, 248, 267, 303, 304
 brookiana (Troides), 1
 brunata (Cheimnatobia), 93
 brutus (Charaxes), 32
 bryonia (Pieris), 22, 56
 bucephala (Pygma), 66, 80
 buna (Metareta), 10
 buoliana (Retinia), 135, 256
 buxtoni (Hypolycæna), 33
 cæruleocephala (Diloba), 277
 cæsiata (Entephria), 77, 232
 calia (Gorgopis), 10
 calia (Thyreos), 10
 calia (Arctia), 64, 66, 184, 254
 calus (Teracolus), 19
 c-album (Graptia), 22
 c-album (Polygona), 57, 258, 259, 299
 calceata (Gnophos), 227
 calescens (Precis), 9
 californica (Adelpha), 20
 callianira (Pereute), 132
 callidice (Pontia), 298
 callnice (Pereute), 132
 callunæ (Lasiocampa), 64
 camelina (Lophopteryx), 130, 157
 camilla (Lumenitis), 206, 259, 261, 282,
 295, 299
 campanulata (Eupithecia), 52
 candiope (Charaxes), 32
 canteneri (Thais), 214, 314
 capensis (Perigea), 10
 capensis (Theretra), 10
 caprimulgella (Tinea), 134
 captiuocula (Phothedes), 18
 cardamines (Euchloe), 56, 157, 295, 318
 cardui (Pyrameis), 7, 9, 57, 145, 230,
 251, 252, 272, 294, 299
 carmelita (Lophopteryx), 157
 carmelita (Odonostia), 131
 carniolica (Zygæna), 260, 262
 carpinata (Lobophora), 43, 157
 carpi (Saturnia), 91, 92, 114, 206
 carthami (Hesperia), 57, 261, 298
 cassandra (Ornithoptera), 29, 30
 cassiope (Erebia), 23, 259, 299
 castigata (Eupithecia), 42
 castrensis (Bombyx), 255
 castrensis (Malacosoma), 155, 206, 255,
 278, 308, 318
 catella (Achæa), 10
 catulla (Catopsilia), 159
 caulonia (Thecla), 11
 cauta (Agrotis), 10
 cebrene (Junonia), 7, 9, 32
 cecilia (Erebia), 23
 celerio (Chærocampa), 9, 45
 celia (Junonia), 32
 cenea (Papilio), 32
 centrostrigaria (Cocnocalpe), 77
 centrovittana (Peronea), 69
 cerberus (Troides), 4
 ceronus (Polyommatus), 317
 certata (Scotosia), 58
 corri (Thecla), 278
 ceryne (Precis), 9
 cespitis (Luperina), 70
 ceto (Erebia), 57
 chalcocozona (Abraxa), 18
 chaonia (Notodonta), 22, 68, 70
 Charaxes, 275
 charithonia (Heliconius), 317
 chi (Polia), 250
 chinensis (Leptosia), 298
 chlorana (Earias), 207
 Chloroclystus, 52
 chlorodippe (Argynnis), 5
 chrysidiformis (Sesua), 23
 chrysippus (Danaus), 7, 9, 30, 317
 chrysoucellus (Crambus), 254
 chrysoplula (Troides), 1
 chrysorrhæa (Porthesia), 21, 184, 254,
 316
 cinerea (Agrotis), 310
 cinnus (Polyommatus), 262
 cinxia (Melitæa), 57, 138, 294, 298
 circe (Satyrus), 258
 cirsii (Hesperia), 261, 298
 cleante (Melanargia), 5
 cleodoxa (Argynnis), 258
 cleopatra (Gonepteryx), 7, 217, 261, 298
 climene (Pararge), 206
 cloacella (Tinea), 134
 cloanthe (Catacroptem), 9
 cœnobita (Catuna), 134
 Coleophora, 23
 collutrix (Polydesma), 10
 columbina (Atella), 9
 combustana (Peronea), 69
 comma (Angiades), 44
 comma (Hesperia), 44, 259
 comma (Pamphila), 298
 comina (Urbicola), 21
 complana (Lithosia), 19
 confusalis (Nola), 274
 confusella (Tinea), 134
 conformis (Xylina), 18, 21
 consignata (Eupithecia), 204
 consimilis (Nopis), 30
 consortaria (Boarmia), 274, 275
 conspiciellaris (Xylonyges), 18
 conspurcatella (Bankesia), 17
 contaminana (Terias), 42
 contraria (Cerocele), 10
 conversaria (Boarmia), 134
 convolvuli (Sphinx), 208, 272, 273
 conyzæ (Hesperia), 298
 coracina (Psodos), 278
 coranus (H.), 33
 cordula (Satyrus), 6, 258, 278, 299
 coretas (Everes), 132
 corinna (Euphœa), 28
 coronata (Chloroclystus), 54
 coronilla (Z.), 296

- corticella (Tinea), 134
 corydon (Agriades), 21, 23, 278
 corydon (Lycæna), 6, 274, 315, 318
 corydonius (Lycæna), 6
 corydon (Polyommatus), 261, 298
 costaeirigalis (Hypenodes), 160
 costalis (Pyralis), 95
 costaeerulæ (Agrotis), 69
 *cotswoldensis (Lycæna), 202
 crabroniformis (Trochilium), 206
 crassa (Psitaleis), 10
 crategi (Aporia), 241, 259, 279, 298
 crategi (Trichlura), 279
 cresphontes (Papilio), 97
 crossida (Eurycens), 29
 crinanensis (Hydrécia), 207
 cristana (Peronea), 155
 crocus (Papilio), 12
 cithalion (Charaxes), 32
 cubicularis (Paradrina), 66
 culiciformis (Egeria), 206
 culmellus (Crambus), 91
 cupriacellus (Numotois), 251
 cursoria (Agrotis), 69, 317
 curtula (Pygæa), 251, 310
 curvistrigaria (Eupœcilia), 17
 custodia (Eubolia), 77
 cydippe (Cethosia), 29
 cynthia (Melitæa), 111
 cytisaria (Pseudoterpna), 278
 dædalus (Hamanumida), 9, 33, 277
 damon (Lycæna), 6, 278
 damon (Polyommatus), 258, 298
 daphidice (Pontia), 215, 216, 259, 278, 296, 298
 dardanus (Papilio), 205
 darwiniana (Cœnonympha), 57
 davus (Cœnonympha), 91
 decolorella (Laverna), 156
 decora (Pais), 10
 decuriella (Dioryctria), 256
 decuria (Tephritina), 10
 defoliaria (Hybernina), 19, 93
 deione (Melitæa), 138, 141, 199, 200, 221, 224, 236, 239, 244, 261, 267, 268, 269, 298, 303, 304
 delamerensis (Tephrosia), 134
 demoleus (Papilio), 32
 denotata (Eupithecia), 52
 derivallis (Hermينيا), 66, 131
 designata (Coremia), 131
 desjardinsi (Euploea), 158
 detitis (Tæda), 10
 dia (Brenthis), 294, 296, 298
 dictæa (Notodonta), 66
 dictæoides (Notodonta), 66
 dictæoides (P.), 274, 275
 dictynna (Brenthis), 141
 dictynna (Melitæa), 57, 94, 139, 200, 222, 223, 247, 268, 302, 304
 didyma (Melitæa), 57, 139, 195, 200, 258, 298
 didymata (Larentia), 91
 dilutata (Oporabia), 21, 22, 44, 76
 diniensis (Leptosis), 261, 262
 diocles (Dendrorix), 32
 dioris (Dendrorix), 31
 diparoides (E.), 316
 dip-sacca (Heliothis), 204
 dispar (Tarache), 10
 dissoluta (Nonagra), 204, 270, 316
 disticta (Timora), 10
 ditrapezium (Noctua), 273
 divisana (Peronea), 69
 djel-elæ (Eretis), 9
 dockneri (Crameria), 10
 dolabraria (Eumymene), 157
 dominula (Aretia), 255
 domnula (Calinmorpha), 277
 doulis (Chrysophanus), 298
 dorilis (Polyommatus), 260, 278
 dorippus (Danaïs), 9, 317
 dorus (Cœnonympha), 7, 258, 299
 doryope (Eurytela), 32
 doubledayana (Amphidasyus), 66, 70, 134, 207, 231
 dromedarius (Notodonta), 21
 dromus (Erebia), 23, 259, 299
 drusilla (Limenitis), 285
 dryas (Enodia), 261, 299
 dubitans (Euclydia), 10
 duplaris (Cymatophora), 43, 58, 131
 duponchelt (Leptosis), 261, 228
 echerioides (Papilio), 33
 echion (Papilio), 11
 edelstem (Nonagra), 316
 edusa (Colias), 183, 206, 216, 217, 229, 230, 239, 251, 252, 258, 260, 271, 272, 273, 291, 301, 309
 egea (Polygonia), 297, 299
 egeria (Pararge), 70, 216, 294
 egesta (Hypolimnas), 133
 eione (Teracolus), 9
 electra (Colias), 9
 eleus (Chrysophanus), 239, 298
 elinguaris (Oreocallis), 23, 44
 elpenor (Chærocampa), 157
 elpenor (Eumorpha), 279
 emutaria (Acidalia), 203
 enotata (Semiolitha), 78
 epilobella (Anybia), 206
 epiphron (Erebia), 299
 epiphron (Melampias), 22
 epiphyria (Ruxoa), 10
 eris (Argynnis), 298
 erisoma (Plusia), 10
 eros (Polyommatus), 55, 260, 298
 erosa (Cosmophila), 10
 erosaria (Ennomos), 311
 Erycides, 206
 erynnis (Erebia), 260
 erysimi (Leptosis), 298
 escheri (Polyommatus), 55, 258
 eubule (Callidryas), 155
 eucharis (Delias), 8, 159
 eumedon (Polyommatus), 55
 eupheme (Zegris), 239
 eupheno (Euchloe), 240

- euphenoides (Euchloë), 213, 215, 240, 241, 301
 euphion (Euphœa), 158
 euphorbie (Deileophila), 70, 201, 232
 euphrosyne (Argynnis), 255, 271, 298
 euphrosyne (Brenthis), 57
 euryale (Erebia), 258, 259, 299, 315
 euryaloides (Erebia), 315
 eurybia (Chrysophanus), 259, 298
 evias (Erebia), 57
 exempta (Spodoptera), 10
 exigua (Caradrina), 80, 272
 exigua (Laphygma), 80
 exoleta (Calocampa), 19
 expallidata (Eupithecia), 318
 extersaria (Tephrosia), 274
 exulans (Zygæna), 278
 exulis (Crymodes), 254
 fagaria (Scodionæ), 315
 fagella (Diurnea), 134
 fagi (Stauropus), 318
 falcula (Drepana), 135
 fasciana (Erastria), 157
 fascialis (Zinckania), 10
 fausta (Zygæna), 260, 262
 favicolor (Leucania), 254
 favillacearia (Scodionæ), 315
 feisthamelii (Papilio), 5, 215, 217, 239, 242, 296
 fenestrella (Endrosis), 159
 fenestrella (Thyris), 278
 fervida (Ægocera), 10
 fibrosa (Helotrophæa), 220, 273
 ficedula (Myrina), 9
 fidia (Satyrus), 261, 299
 filipendulæ (Zygæna), 44, 249
 firmata (Thera), 279
 flammatrix (Agrotis), 71
 flammea (Trigonophora), 42
 flava (Adopæa), 133
 flava (Zygæna), 278
 flavago (Xanthia), 157
 flavescens (Xanthia), 159
 flavicornis (Polyplocæ), 157
 florella (Catopsilia), 9
 fluctuata (Melanippe), 23, 65, 95
 fluviata (Camptogramma), 43, 159, 277
 fluviata (Phibalapteryx), 19
 fontis (Bomolocha), 157
 forsterana (Tortrix), 65, 68
 franconia (Malacosoma), 206
 fritillum (Hesperia), 298
 fuciformis (Hemaris), 157
 fullonica (Mænas), 9
 fulva (Tapinostola), 220
 fulvago (Xanthia), 157, 159
 fulvalis (Phylæanodes), 10
 fulvimitrella (Tinea), 134
 funebris (Nephele), 10
 furcata (Hydriomena), 76
 fuscantaria (Ennomos), 93, 311
 fuscata (Hybernina), 63, 134
 fuscipunctella (Tinea), 159
 fuscula (Erastria), 274
 galatea (Melanargia), 203, 254, 299
 gamma (Plusia), 93, 229
 geminipuncta (Nonargia), 231
 geniste (Hadena), 157, 271
 geoffroyi (Mynes), 30
 gilvago (Melinia), 95
 glabraria (Cleora), 18
 glacialis (Erebia), 206, 260, 299
 glandifera (Bryophila), 23
 glauce (Anthocharis), 214, 215, 217, 212
 glaucinaus (Durgaria), 10
 glauconome (Synchlœa), 9
 glyphica (Eueladia), 157
 gnaphali (Cucullia), 18
 goante (Erebia), 259, 297, 299
 goliath (Troides), 1
 goochi (Neptis), 32
 gordius (Chrysophanus), 56, 262, 298
 gorge (Erebia), 23, 259, 299
 goudoti (Euphœa), 67, 158
 grandis (Stenopelia), 133
 granella (Tinea), 131
 graphodactyla (Alucita), 318
 grisealis (Zanclognatha), 131
 griseocapitella (Swammerdamia), 207
 griseola (Lithosia), 218
 grossulariata (Abraxas), 23, 70, 113, 136, 249, 253, 251, 277, 279, 318
 guenavadi (Pandema), 10
 guenécata (Ochyria), 77
 halimede (Teracolus), 9
 haliphron (Troides), 2, 68
 halterata (Iobophora), 43
 hamata (Danaïs), 30
 hamula (Drepana), 275
 hanno (Troides), 2
 harmonica (Vanessa), 134
 harpagula (Drepana), 42
 hastiana (Peronea), 69, 155
 helena (Troides), 3, 4
 helice (Colias), 206, 217, 251, 252, 291
 hellica (Synchlœa), 9
 heparana (Tortrix), 68, 317
 hephæstus (Troides), 3
 hera (Callimorpha), 258, 261
 hermannella (Aristotelia), 278
 hermæthena (Heliconius), 317
 hermione (Satyrus), 258, 299
 Heterochron, 20
 hethlandica (Hepialus), 279, 318
 hiarbus (Eurytela), 32
 hiera (Pararge), 57
 hippocastanaria (P.), 275
 hippocrepidis (Anthrocera), 22
 hippocrepidis (Zygæna), 69, 317
 hippothoe (Chrysophanus), 259, 298
 hirtaria (Biston), 253
 hirundo (Ællopos), 9
 hispana (Lycæna), 6, 7
 hispula (Epinephele), 217, 299
 homerus (Papilio), 97, 132
 *honestæ (Stegania), 79
 horta (Acraea), 9
 hostilis (Nephoteryx), 128

- howqua (*Stichophthalma*), 133
 humilata (*Aedolaba*), 42, 308
 humuli (*Hepialus*), 89, 133, 279, 318
 hutchesoni (*Grapta*), 22
 hyale (*Colias*), 9, 56, 229, 298, 315
 hyemana (*Tortricodes*), 63
 hylas (*Cephonodes*), 9
 hylas (*Lyceana*), 6
 hylas (*Polyommatus*), 56, 298
 hyperborea (*Paclimbia*), 279
 hyperanthus (*Epinephele*), 249
 hyperlophia (*Tarache*), 10
 hypolitus (*Triodes*), 2
 hypotenaria (*Metacrotis*), 10
 ianira (*Epinephele*), 23, 70, 91, 217, 249, 279, 295
 iberica (*Melitaea*), 315
 icarus (*Lyceana*), 70, 315
 icarus (*Polyommatus*), 22, 278
 ichnusa (*Aglaia*), 241
 ida (*Epinephele*), 7, 217
 idrieus (*Basiothea*), 9
 ilieis (*Thecla*), 278
 ilithya (*Byblia*), 9
 illunaria (*Solenia*), 131
 illustraria (*Solenia*), 157, 277
 imitator (*P.*), 32
 immanata (*Cidaria*), 69, 96
 imperator (*Tetacolus*), 9
 impluviata (*Ypsipetes*), 131
 impura (*Leucania*), 218, 219
 inachis (*Kallima*), 29
 inconspicua (*Solenobia*), 18
 indica (*Glyphodes*), 10
 indosa (*Lethes*), 33
 ines (*Melanargia*), 215, 217, 239, 275
 innotata (*Eupithecia*), 52, 90
 ino (*Brenthis*), 258, 298
 ino (*Melitaea*), 141
 instrumentalis (*Ambia*), 207
 interpunctella (*Plodia*), 68, 318
 interruptata (*Cidaria*), 77
 interstria (*Myragalis*), 10
 inventaria (*Entephria*), 78
 io (*Vanessa*), 57, 70
 iole (*Lachnoptera*), 134
 iota (*Plusia*), 43, 66
 iphis (*Ctenonympha*), 258, 259, 299
 iris (*Troides*), 2
 irriguata (*Eupithecia*), 204
 *isara (*Troides*), 3
 isobea (*Tinioleus*), 11
 japonaria (*Operophtera*), 76, 77
 japygia (*Melanargia*), 5
 jasius (*Charaxes*), 21
 jatrophia (*Cylopoda*), 78
 Jemadia, 206
 johnstoni (*Peridela*), 10
 jurtina (*Epinephele*), 158, 279, 299, 318
 jyntana (*Celastrina*), 316
 kershawii (*Pyrameis*), 133
 klugii (*Danaus*), 9, 317
 knysna (*Zizera*), 9
 labanea (*Gorgopis*), 10
 laburnella (*Ceniosoma*), 318
 lausalis (*Sceliodes*), 10
 lamprota (*Papilio*), 95
 lanceolata (*Tiomora*), 10
 lappona (*Erebia*), 23, 299
 lapponaria (*Nyssia*), 18
 lateritia (*Metarctia*), 10
 lathonia (*Issoria*), 57, 298
 latmargo (*Cylopoda*), 78
 latirupta (*Coremia*), 77
 latona (*Cylogramma*), 7, 9
 lavandula (*Zygana*), 185, 241
 leda (*Eionia*), 32
 leda (*Melanites*), 32
 lefebvrei (*Erebia*), 23, 67, 91, 206
 leilus (*Urania*), 23
 leporina (*Acronycta*), 274
 leucodrosina (*Perenta*), 132
 leuconia (*Dismorphia*), 314
 leucophaea (*Hybernia*), 63, 95, 135
 leucophaea (*Peronea*), 69
 leucosoma (*Cherippa*), 10
 leucostigma (*Helictropha*), 219, 220, 273
 lewenhoekella (*Pancalia*), 207
 libatrix (*Scoliopteryx*), 153, 157, 182
 lichena (*Epunda*), 310
 lichenella (*Solenobia*), 18
 lignigalis (*Pyralis*), 67
 ligea (*Erebia*), 258, 299, 315
 ligustri (*Sphinx*), 203
 limbatus (*Celastrina*), 316
 limacodes (*Cochilidon*), 274
 limentis, 20, 21
 limoniella (*Coleophora*), 316
 linea (*Estigmene*), 10
 lineola (*Thymoloeus*), 242, 258, 298
 lineolata (*Eubolia*), 63, 95
 lineolata (*Mesotype*), 95
 lithargyria (*Leucania*), 219
 liturata (*Maecaria*), 66, 91, 136, 277
 liturifera (*Tarache*), 10
 livornica (*Deilephila*), 204
 livornica (*Phryxus*), 203
 locupletella (*Aucylolomia*), 10
 logiana (*Peronea*), 69
 lorquini (*Cupido*), 215, 217
 lubricipeda (*Spilosoma*), 64, 114
 lucens (*Hydractia*), 135, 207
 lucerna (*Agrotis*), 41
 lucida (*Zizera*), 9
 lucilla (*Neptis*), 206
 lucina (*Nemeobius*), 317
 lucipara (*Euplexia*), 157
 lunaris (*Ophiodes*), 278
 lunigera (*Agrotis*), 41, 310
 lupulinus (*Hepialus*), 133
 luscina (*Cidaria*), 77
 lutearia (*Oleogene*), 278
 luteata (*Asthenia*), 157
 lutescens (*Dicranis*), 10
 lutulenta (*Aporophyla*), 193
 lutulenta (*Epunda*), 44
 lyæus (*Papilio*), 32, 90

- lycaon (Epinephele), 7, 259, 299
 lycaon (P.), 30
 lychnidis (Cucullia), 159
 lycidas (Lycæna), 89
 lycidas (Rusticus), 55
 lyllus (Cenonymphe), 299
 machaon (Papilio), 56, 71, 95, 217, 242, 261, 296
 macleayanus (P.), 30
 mæra (Pararge), 57, 258, 299
 mafa (Hesperia), 9
 malve (Acontia), 10
 malve (Hesperia), 57, 253, 294, 298
 manniana (Eupœilia), 17
 margaritata (Tarache), 10
 marginaria (Hybernia), 134
 marginata (Lomasipilis), 157
 *marginata (Lycæna), 202
 marginepunctella (Diplodoma), 18
 maritima (Senta), 204, 231
 maritimella (Coleophora), 205
 marmorea (Rhodophaea), 317
 marpeasa (Neptis), 32
 marshalli (Cacyreus), 9
 materna (Agadesa), 9
 mathias (Parnara), 7
 maturna (Melitæa), 138, 141
 mayrana (Peronea), 69
 medesicaste (Thais), 214, 297, 314
 medusa (Erebia), 206
 medusa (Nychitona), 68
 megæra (Pararge), 215, 299, 301
 Melanitis, 20
 melanopa (Anarta), 279, 318
 melanops (Nomiades), 216, 217, 241, 301
 melas (Erebia), 67, 206
 meleager (Polyommatus), 260, 261, 262, 298
 melpomene (Heliconius), 132
 menthastri (Spilosoma), 64, 66
 menyanthidis (Acronycta), 65
 meridionalis (Zegris), 239, 240
 merope (Heteronympha), 31
 mesentina (Belenois), 7, 9
 meticulosa (Phlogophora), 93
 miata (Cidaria), 58, 131
 micæa (Hydræcia), 93
 midas (Chrysophanus), 296
 miniata (Calligenia), 19, 158
 miniata (Milocheirista), 157
 minutana (Grapholitha), 133
 minima (Cupido), 56, 273, 274, 298
 minima (Zizera), 273
 miniosa (Tœniocampa), 123
 minos (Zygæna), 44, 135, 260
 minutata (Eupithecia), 129
 misippus (Hypolimnas), 9, 317
 mneme (Melimæa), 20
 mnemosyne (Parnassius), 56
 mnestra (Erebia), 299
 mohozutzo (Kedestes), 9
 moneta (Plusia), 203, 231, 274
 monosticta (Ortholitha), 10
 montana (Cupido), 298
 montanata (Melanippe), 65
 monteironis (Sphingomorpha), 10
 *mopa (Troides), 3
 morantii (Parosmodes), 9
 morpheus (Caradrina), 66
 mucronellus (Schemobius), 218
 multiradiata (Raghuia), 10
 multistrigaria (Larentia), 63, 95
 *multomaculata (Lycæna), 202
 munda (Tœniocampa), 311
 mundata (Gnophos), 227, 277
 muralis (Bryophila), 16
 murinaria (Tephrosia), 79
 muscerda (Pelosia), 219, 220
 Mycalesis, 20
 myrmoleon (Salophonotus), 277
 myrmidione (Colias), 206
 nævana (Grapholitha), 256
 nævana (Rhopobota), 256
 næviferella (Aristotelia), 254
 napi (Pieris), 22, 42, 70, 71, 276, 277, 315
 narycia (Pseudonympha), 9
 natalensis (Crenis), 32
 natalis (Tarache), 10
 natalica (Acraea), 9
 *natancensis (Troides), 1
 neanthes (Charaxes), 32, 315
 nebulosa (Aplecta), 66, 93, 155, 314
 nebulosa (Salamis), 32
 neglecta (Noctua), 44
 nemoralis (Agrotia), 279
 nemoralis (Zanclognatha), 131
 neobulæ (Acraea), 9
 neorides (Erebia), 258, 259, 260, 297, 299
 *neoris (Troides), 3
 nerii (Daphnis), 10
 neurica (Nonagria), 270, 271, 316
 neustria (Malacosoma), 68, 155, 257, 308
 nexifasciata (Oporabia), 76
 niavius (Amauris), 133
 nicholli (Erebia), 206
 nietitans (Hydræcia), 96, 135, 207, 317
 nigra (Aporophylla), 93, 157, 274, 275
 nigra (Megisba), 31
 nigra (Tephrosia), 158
 nigripunctella (Tinea), 134
 nigristriaria (Entophria), 77
 nigrocineta (Polia), 21, 273
 nigrolasciaria (Anticlea), 157
 nigrofulvata (Macarina), 66, 91, 136, 277
 nigrosparsata (Ahraxus), 277
 niobe (Argynnis), 258, 298
 *nisseni (Zygæna), 185
 nitidula (Conchlia), 10
 nivescens (Lycæna), 6, 7
 nobilis (Euproctis), 10
 nubeculosa (Asteroecopus), 317
 nubifer (Uranotauma), 9
 numata (Heliconius), 20
 obeliscæ (Agrotis), 41, 275
 oberthuri (Lycæna), 23, 67
 oblongomaculatus (Troides), 2
 obscura (Anthrocera), 22
 obscura (Lycæna), 56, 202
 obscurata (Gnophos), 227

- obscuraria (Gnophos), 96
 obsoleta (Agridades), 278
 obsoleta (Chloridea), 10
 obsoleta (Epinephele), 255
 obsoleta (Erebia), 259, 299
 obsoleta (Lycæna), 318
 *occidentalis (Lycæna), 202
 occitanica (Melitæa), 240
 ocellaris (Bombycia), 23
 ocellana (Hedya), 133
 ocellaris (Erebia), 315
 ocellaris (Mellina), 22
 ocellata (Smerinthus), 253
 ocellatus (Smerinthus), 92, 316
 ochrata (Acidalia), 16, 279
 ochrearia (Amphidasys), 112
 ochroleuca (Eremobia), 279
 octavia (Precis), 134
 octogesima (Cymatophora), 156
 octogesima (Palimpsestis), 156
 œdippus (Cœnonympha), 206
 œme (Erebia), 23
 oleracea (Hadena), 128
 olivacea (Polia), 69
 olivata (Larentia), 95
 omphale (Teracolus), 8, 9
 omphaloides (Teracolus), 9
 oo (Dicycla), 231
 *oolitica (Lycæna), 202
 onosmella (Coleophora), 19, 22
 opheltes (Deilephila), 10
 ophidicephalus (Papilio), 33
 ophiogramma (Apamea), 274
 opima (Tœniocampa), 63
 ophthalmicæna (Pædisca), 256
 optilete (Polyommatus), 258, 298
 orbitulus (Lycæna), 23, 67
 orbitulus (Polyommatus), 260, 298
 orbonalis (Leucinodes), 10
 orichalcea (Plusia), 21
 orion (Lycæna), 278
 ornataria (Semiothisa), 79
 osiris (Alyria), 78
 osiris (Cyllopoda), 78
 osiris (Flavinia), 78
 osseana (Aphelia), 91
 ossenta (Acidalia), 62
 othoe (Dismorphia), 314
 ovata (Cyllopoda), 78
 oxyacanthæ (Miselia), 95
 palæmon (Cyclopides), 254
 palæmon (Hesperia), 102, 154, 254
 palæno (Colias), 56
 pales (Brenthis), 260, 278, 298
 pallens (Leucania), 219
 *pallida (Lycæna), 202
 pallida (Scoparia), 218
 pallidactyla (Gillmeria), 279
 pallidistria (Argyrotis), 10
 paludis (Hydrocia), 96, 135, 207
 paludum (Trichoptilus), 89
 palustris (Hydrilla), 18
 pamphilus (Cœnonympha), 18, 255, 294,
 299, 301
 paniscus (Cyclopides), 254
 paniscus (Hesperia), 102, 154
 panoptes (Polyommatus), 239
 pantaria (Abraxas), 22
 paphia (Argynnis), 203, 206, 253, 254,
 255, 258, 274; (Dryas), 275, 298, 314
 paracensis (Pemyria), 77
 paradoxa (Pseudopontia), 68
 parasitella (Tinea), 134
 parthene (Melitæa), 57, 130, 138, 140,
 195, 200, 222, 224, 226, 244, 261, 267,
 268, 269, 278, 294, 299, 302, 304
 parthenoides (Melitæa), 140
 pasiphæ (Epinephele), 7, 216, 217
 pedana (Phigalia), 133
 pelitigera (Heliothis), 23
 peletieraria (Cleogenes), 23
 pennaria (Humera), 43
 pereulta (Aron), 10
 perla (Bryophila), 17
 permutana (Peronea), 317
 pelionella (Tinea), 159
 pheretes (Lycæna), 278
 phicomone (Colias), 56, 260, 298
 philea (Cœnonympha), 299
 philippus (Hypocæna), 9, 32
 philoxenus (Papilio), 206
 phisadia (Teracolus), 9
 phlæas (Chrysophanus), 71, 157, 239,
 298, 315, 318
 phlæas (Rumicia), 159, 254
 phœbe (Melitæa), 57, 240, 258, 295, 298
 phœbe (Notodonta), 156
 phorobanta (Papilio), 67
 phragmitellus (Cimlo), 218
 phragmitidis (Calamæa), 231
 phyllocampa (Hoplitis), 277
 picarella (Tinea), 134
 pierrari (Megalodes), 10
 pilosaria (Phigalia), 63
 pilosellæ (Melitæa), 138
 pimpinellata (Eupithecia), 54, 271
 pinastri (Hyloicus), 203, 232
 pinaria (Bupalus), 91, 157, 182
 pinicolana (Reticina), 135, 256
 piniperda (Panolis), 206
 pisistratus (Rhapalocampa), 9
 pistacina (Anchocelis), 93
 plantagnis (Nemeophila), 95
 pleione (Teracolus), 9
 plexippus (Anosia), 255
 plumbaria (Eubolia), 23
 plumbeolata (Melanthia), 69
 podalirius (Papilio), 5, 56, 215, 258, 261,
 294, 296
 podana (Tortrix), 68
 politus (Thecla), 10
 polychloros (Eugonia), 57, 215, 254, 295
 polyodon (Xylophasia), 44, 66
 populi (Amorpha), 69
 populi (Limenitis), 206
 populi (Pœcilocampa), 93, 157, 310
 populi (Smerinthus), 70, 92, 132, 203,
 230, 316

- porcellus (*Cherocampa*), 58, 184
 porina (*Araschnia*), 20
 porphyria (*Agrotis*), 91
 potatoria (*Cosmographie*), 22
 prefecta (*Scirocastnia*), 159
 prasinana (*Halio*), 95
 prasinana (*Hylophila*), 95, 157
 prepicella (*Ancylolomia*), 10
 priamus (*Troides*), 1
 priapus (*Papilio*), 95
 plicura (*Satyrus*), 6
 progemma (*Hybernia*), 63, 133
 promineus (*Leucania*), 10
 promissa (*Catocala*), 23
 pronubana (*Tortrix*), 23, 49, 68, 70, 159,
 184, 279, 309
 prorsa (*Araschnia*), 19, 20
 prorsa (*Papilio*), 283
 prosopha (*Cupha*), 30
 protea (*Hadena*), 157
 proto (*Hesperia*), 6
 proto (*Pyrgus*), 215, 217, 261, 298
 pruinana (*Penthina*), 156
 pruinaria (*Angerona*), 159
 pruinata (*Pseudoterpna*), 62, 278
 pseudetrida (*Teracolus*), 8, 9
 *pseudo-alcon (*Lycæna*), 202
 psi (*Acronycta*), 96
 psodea (*Erebia*), 206
 puncticostata (*Migragrotis*), 10
 pudibunda (*Dasychira*), 62
 pudicata (*Ortholitha*), 10
 pulchella (*Deiopeia*), 30
 pulchella (*Utetheisa*), 7, 9
 pulchrina (*Plusia*), 43
 pulveraria (*Numeria*), 65, 157
 punctella (*Tinea*), 134
 puta (*Agrotis*), 44, 229
 pygmaea (*Asthenia*), 208
 pyralina (*Calymnia*), 274
 pyralina (*Cosmia*), 231
 pyramidea (*Amphipyra*), 157
 pyrenaella (*Oreopsyche*), 21, 23
 pyrenaica (*Lycæna*), 94, 318
 pyri (*Saturnia*), 115
 quadrifasciaria (*Coremia*), 274
 quadripunctata (*Euproctis*), 10
 quercinaria (*Ennomos*), 311
 quercus (*Lasiocampa*), 64, 71, 91, 312
 quercus (*Zephyrus*), 157, 274, 297
 rahira (*Acræa*), 9
 ramaguebana (*Teracolus*), 8, 9
 rapæ (*Pieris*), 63, 71, 294, 298, 301, 315
 reclusa (*Pygma*), 310
 rectangulata (*Eupithecia*), 204
 regulata (*Semiothisa*), 78
 *relegata (*Operophtera*), 76, 77
 remota (*Idæa*), 10
 repandata (*Boarmia*), 93, 134, 135, 159
 resinea (*Retinia*), 206
 reticulata (*Lygris*), 18
 rhamni (*Gonepteryx*), 157, 260, 294, 298,
 308
 rhodope (*Mylothris*), 134
 rhomboidaria (*Boarmia*), 66
 *richardsi (*Semiothisa*), 79
 ridens (*Polyplocæ*), 18, 157
 ripartii (*Lycæna*), 6
 roboraria (*Boarmia*), 23
 robsoni (*Aplecta*), 66, 314
 roxelana (*Pararge*), 206
 ruba (*Platylesches*), 9
 rubi (*Bombyx*), 21, 150
 rubi (*Callophrys*), 157
 rubi (*Macrothylacia*), 40, 206, 207
 rubi (*Noctua*), 43, 277
 rubi (*Thecla*), 301
 rubidata (*Anticlea*), 94, 130, 274
 rubiginea (*Orhodia*), 274
 rufa (*Cænobia*), 218, 219
 rufescens (*Metaretea*), 10
 ruficostana (*Peronea*), 23
 rumina (*Thais*), 214, 215, 217
 rupicapra (*Hybernia*), 95
 russula (*D.*), 24
 russula (*Nemophila*), 91
 saceraria (*Rhodomestra*), 250, 270
 sacraia (*Stertha*), 10, 270
 salicis (*Leucoma*), 43
 sambucaria (*Uropteryx*), 66
 sanio (*D.*), 24
 sao (*Hesperia*), 57
 sao (*Pyrgus*), 210, 258, 298
 sarpedon (*Papilio*), 28, 30
 satellitia (*Scopelosoma*), 44
 saucia (*Agrotis*), 160, 275
 scabiosa (*Eupithecia*), 271
 scabrella (*Harpiteryx*), 10
 scabriuscula (*Hipterygia*), 22, 157
 "schmidtiformis" (*M.*), 200
 schreibersiana (*Argyrolepis*), 17
 schrenki (*Cherocampa*), 9
 scipio (*Riebia*), 257, 258, 260, 297
 scrophularia (*Cucullia*), 159
 scutaligera (*Chloridea*), 10
 segetis (*E.*), 71
 segetum (*Agrotis*), 318
 selene (*Argynnis*), 18, 201, 274
 selene (*Brenthis*), 294
 semele (*Hipparchia*), 242, 258, 299
 semele (*Satyrus*), 70
 semargus (*Lycæna*), 206
 semiargus (*Nomiades*), 56, 260, 298
 semibrunnea (*Xylina*), 70, 253, 274
 semisyngnatha (*Agriades*), 21
 sempronius (*Charaxes*), 28
 senex (*C.*), 204
 senex (*Nudaria*), 158, 218
 serapis (*Danaïs*), 31
 seratulæ (*Hesperia*), 57
 serena (*Hecatera*), 92
 sesunus (*Precis*), 9
 severina (*Belenois*), 9
 shepherdii (*Neptis*), 28, 30
 sibilla (*Limenitis*), 284, 317
 sibilla (*Limenitis*), 204, 206, 274
 siccifolia (*Coleophora*), 253
 sidas (*Iolus*), 32

- sikkima (Celastrina), 316
 silaceata (Cidaria), 157
 silas (Iolus), 32
 simplex (Anthena), 10
 simplonia (Anthocharis), 56
 sinapis (Leptosia), 56, 261, 298
 sinapis (Leucophasia), 295
 sinuata (Anticla), 22
 smaragdaria (Phorodesma), 206
 sobria (Odontocheilopteryx), 10
 socia (Xylina), 157, 253
 sociata (Melanippe), 95
 sordidata (Hypsipetes), 22, 76
 sororcula (Lithosia), 157
 sparganii (Nonagria), 279, 318
 sparsata (Collix), 274
 sphinx (Brachionycha), 19
 *spilotia (Troides), 4
 spini (Thecla), 259, 298
 spinifera (Euxoa), 10, 71
 splendidella (Dioryctria), 256
 spoliata (Idaea), 10
 sponsa (Cutocala), 23
 spurcata (Zaria), 10
 stabilis (Tæniocampa), 311
 statilinus (Satyrus), 258, 299
 standingfreana (Neptis), 30
 stellatarum (Macroglossa), 157, 203, 272
 steveni (Polyommatus), 260, 298
 stevensata (Eupithecia), 18
 sthenryo (Erebia), 23
 stipella (Aristotelia), 254
 straminealis (Evergestis), 95
 straminea (L.), 204, 281
 stramineola (Lithosia), 218, 220
 strataria (Amphidasys), 135
 stratiotalis (Paraponyx), 66
 strigibasis (Migragrotis), 10
 strigularia (Acidalia), 16
 strigula (Agrotis), 91
 stygne (Erebia), 23, 258, 299, 316
 subtusa (Teutha), 207
 suasa (Hadena), 128
 suavella (Rhodophua), 279, 317
 submacula (Tetragotona), 10
 subsequa (Triphæna), 204
 suffumata (Cidaria), 157
 sugriva (Bindahassa), 31
 superba (Xanthospilopteryx), 10
 sylvanus (Augiades), 157
 sylvanus (Pamphila), 57
 sylvata (Abraxas), 22, 250, 271
 tacuna (Leucania), 10
 tages (Nisoniades), 57, 241, 294, 298
 tagis (Anthocharis), 214, 216, 241
 tamariscata (Eupithecia), 53
 taras (Hesperia), 253
 tarquinia (Pseudacraea), 31
 telicanus (Lampides), 6, 217
 temerata (Bapta), 157
 templi (Dasypolia), 19, 93, 272
 tenebrata (Heliaca), 157
 Tephroclystis, 52
 Teracolus, 32
 terbulentata (Osteodes), 10
 testacea (Apamea), 43
 thaumas (Adopsea), 133
 thaumas (Hesperia), 157
 therapne (Pyrgus), 240
 thoas (Papilio), 20
 thompsoni (Aplecta), 66, 314
 thyodamas (Cyrestis), 68
 thyra (Pieris), 31
 tiliaria (Ennomos), 19, 93, 311
 tipuliformis (Sesia), 15
 tithonus (Epinephele), 23, 249, 274, 299
 togata (Eupithecia), 40
 transalpina (Zygana), 262
 trepida (Notodonta), 157
 triangulum (Noctua), 157
 trifasciata (Hypsipetes), 131
 trifolii (Anthrocera), 20, 22
 trifoli (Zygana), 344, 17
 triphus (Notodonta), 156
 trimaculata (Stegania), 79
 triplasia (Habrostola), 66
 trisignaria (Eupithecia), 54
 tristata (Melanippe), 16
 tritici (Agrotis), 275
 trivina (Melitæa), 143
 trochiloides (Macroglossa), 9
 tropica (Tarache), 10
 tropicalis (Pentila), 32
 truncicollata (Scoparia), 133
 turbidalis (Phlyctænodes), 128
 tuttodactyla (Marasmarcha), 23
 tyndarus (Erebia), 23, 57, 258, 299
 typhæ (Nonagria), 274
 *typhaon (Troides), 4
 typica (Matope), 10
 tyrreæ (Naudaurelia), 10
 uhagonis (Satyrus), 6
 ulmata (Abraxas), 70, 250, 271
 ulvæ (Senta), 204
 nlysses (Papilio), 29, 30
 umbrosa (Noctua), 220
 uncula (Hydrelia), 19
 undulosa (Epirrhoe), 10
 urticæ (Aglais), 211, 259, 299
 urticæ (Vanessa), 45, 57, 63
 urticata (Eurrhynx), 251
 vagans (Leucinodes), 10
 valesina (Argynnis), 203, 253
 varanes (Charaxes), 32
 varia (Melitæa), 57, 130, 140, 196, 197,
 221, 224, 244, 267, 268, 299, 304
 varia (Metachrois), 10
 variata (Thera), 149
 varleyata (Abraxas), 18, 255, 277, 318
 vauaria (Halia), 43, 70
 vellida (Junonia), 30
 venustalis (Phlyctænodes), 10
 verbasci (Cucullia), 70, 159
 verhuelli (Dercas), 68
 verhuellata (Teichobia), 18
 vernaria (Geometra), 95
 vernaria (Iodis), 96
 versicolor (Endromis), 114

vestigialis (Agrotis), 150, 274, 275
 vibulena (Thecla), 11
 vigilans (Pseudonympha), 9
 vinetalis (Tathorhynchus), 10
 vinula (Dieranura), 92, 206, 278
 virgata (Mesotype), 95
 virgaurea (Chrysophanus), 259, 298
 virgaurea (Colcophora), 277, 316, 318
 virgularia (Acidalia), 155
 viridata (Nemoria), 254
 vitellina (Leucania), 18, 41, 273, 310, 318
 wahlbergi (Duralia), 32
 warscewiczii (Papilio), 206
 webbianus (Lampides), 205
 wismariensis (Senta), 204
 wockii (Solenobia), 18
 woerberiana (Semasia), 133
 woodiana (Brachy.), 17
 xanthographa (Noctua), 44
 xantholopha (Leptodermista), 10

xanthomista (Polia), 21, 273
 xanthosoma (Phiala), 10
 xeraupelina (Cirrheidia), 93, 156, 311
 xipares (Charaxes), 32
 xylostella (Cecrostoma), 253
 ypsilon (Agrotis), 71, 72, 203
 zapateri (Irebia), 5
 zavaleta (Disceana), 314
 zelica (Leucothyris), 314
 zelima (Irexis), 30
 zephyrus (Iycena), 89
 zephyrus (Rusticus), 55
 zermattensis (Chrysophanus), 259
 ziba (Thecla), 11
 ziczac (Notodonta), 21
 zochalia (Belcenis), 21
 zolus (Tellervo), 80
 zonaria (Nyssia), 63
 zoolina (Charaxes), 32, 315

NEUROPTERA.

aenea (Cordulia), 22, 119, 143, 171, 276, 311
 Æschna, 172
 alpina (Dictyopteryx), 270
 Amphinemoura, 202
 Anax, 172
 annulatus (Cordulegaster), 143, 167, 202
 arctica (Somatochlora), 143
 armatum (Agrion), 168
 bidentatus (Cordulegaster), 202
 Brachytron, 172
 cærulescens (Orthetrum), 143, 167, 276
 cancellatum (Orthetrum), 118, 143, 167, 171, 276, 311
 centralis (Limnophilus), 205
 Chlorogomphina, 72, 136
 Chrysopa, 228
 coecajus (Ascalaphus), 202
 communis (Panorpa), 270
 Coniopteryx, 132
 Cordulegasterinae, 72, 136
 curtisii (Oxygastra), 143, 158
 cyanea (Æschna), 120, 143, 168, 171, 252, 271
 cyathigerum (Enallagma), 171, 172, 252
 depressa (Libellula), 118, 143, 171, 276
 dryas (Lestes), 143, 169, 170, 171, 252
 elegans (Ischnura), 168, 170, 171, 252
 elegans var. infuscans (Ischnura), 252
 elegans var. rufescens (Ischnura), 170, 252
 Ephemera, 207
 flaveolum (Sympetrum), 117, 118, 171
 flavomaculata (Cordulia), 172
 fonscolombii (Sympetrum), 270, 276
 forcipata (Lindenia), 120, 171
 Forficulidae, 136
 fulva (Libellula), 143, 276, 311
 fusca (Sympyca), 169, 171
 germanica (Panorpa), 205
 Gomphinae, 72, 136
 Gomphus, 172

grammica (Chloroperla), 202
 grandis (Æschna), 120, 143, 171, 252
 guttulata (Hecalisopteryx), 202
 hastulatum (Agrion), 168
 hilaris (Isocus), 136
 hirtus (Megalomus), 202
 imperator (Anax), 118, 167, 253, 276
 isosceles (Æschna), 120, 143, 171, 276, 311
 juncea (Æschna), 143
 latipes (Platynemesis), 202
 Lestes, 172
 Libellula, 172
 lindensii (Agrion), 171, 172
 longicornis (Ascalaphus), 202
 maxima (Perla), 202
 mecuriale (Agrion), 168, 202
 meridionalis (Panorpa), 202
 metallica (Somatochlora), 119, 143, 171, 276
 mixta (Æschna), 143, 312
 montanus (Philopotamus), 202
 monticola (Drusus), 202
 najas (Erythronema), 117, 170, 171, 252, 276, 311
 Nemoura, 202
 nigrescens (Drusus), 270
 notata (Raphidia), 233
 nymphula (Pyrrhosoma), 38, 143, 167, 170, 171, 202
 nymphula var. æneatum (Pyrrhosoma), 22, 38
 nymphula var. melanotum (Pyrrhosoma), 38
 Orthetrum, 172
 pædemonianum (Sericostoma), 270
 pellucidula (Hydropsyche), 202
 pennipes (Platynemesis), 169, 170, 171, 276
 pennipes var. bilineata (Platynemesis), 170

- pennipes* var. *lactea* (*Platynemis*), 170, 276
pratense (*Brachytron*), 276, 311
pulehellum (*Agrius*), 170, 171, 252
pundio (*Ischnura*), 168, 170, 171
puella (*Agrius*), 171, 172, 228
pyrenaicum (*Sericostoma*), 202
quadrinaculata (*Libellula*), 118, 171, 276, 311, 314
quadrinaculata var. *præ-nubila* (*Libellula*), 314
rectus (*Drusus*), 202
sanguineum (*Sympetrum*), 22, 117, 118, 167, 171, 252
scoticum (*Sympetrum*), 22, 117, 118, 171, 252
Somatochlora, 136
splendens (*Calopteryx*), 143, 168, 171, 252
sponsa (*Lestes*), 143, 167, 169, 171, 252
striolatum (*Sympetrum*), 117, 167, 171, 252, 270
tenellum (*Pyrrhosoma*), 38, 143, 276
tenellum var. *aneatum* (*Pyrrhosoma*), 22, 38
tenellum var. *erythrogastrium* (*Pyrrhosoma*), 38
tenellum var. *intermedium* (*Pyrrhosoma*), 38
tenellum var. *melanogastrium* (*Pyrrhosoma*), 38
tenellum var. *rubratum* (*Pyrrhosoma*), 22, 38
torrentium (*Isopteryx*), 205
tortricoides (*Megalomus*), 202
tristis (*Rhyacophila*), 202
virgo (*Calopteryx*), 143, 168, 171
viridis (*Lestes*), 169, 171
viridulum (*Erythronima*), 117, 170, 171
vulgaris (*Panorpa*), 270
vulgatissimus (*Gomphus*), 119, 143, 171
vulgatum (*Sympetrum*), 39, 90, 117, 171
zopateri (*Leptocerus*), 208

ORTHOPTERA.

- albopunctata* (*Metrioptera*), 279
americana (*Periplaneta*), 186, 187
aptera (*Chelidura*), 45
auricularia (*Forficula*), 45
australasiæ (*Periplaneta*), 187
bicolor (*Stenobothrus*), 187
bipunctata (*Anechura*), 45
Blatta, 158
brachyptera (*Metrioptera* [*Platyceis*]), 279
brazzæ (*Nauphocta*), 96
brunnea (*Nyctibora*), 279
cærulescens (*Edipoda*), 278
cincea (*Nauphocta*), 96
cinereus (*Olythoscelis*), 188
cinereus (*Thamnotherizon*), 279
crurifolium (*Pulethriphyllium*), 205
decorata (*Stylopyga*), 187
domesticus (*Gryllus*), 45
olegans (*Stenobothrus*), 187
germanica (*Blatta*), 275
germanica (*Phyllodromia*), 186
grisea (*Platyceis*), 279
griseoptera (*Pholidoptera*), 279
grossus (*Mecostethus*), 187
holosericea (*Nyctibora*), 187, 279
lapponica (*Ectobia*), 158, 186
lesnei (*Forficula*), 45, 186
littorea (*Anisolabis*), 45
livida (*Ectobia*), 186
maculatus (*Gomphocerus*), 187
maritima (*Anisolabis*), 45
mauritanica (*Anisolabis*), 45
media [*albipennis*] (*Apterygida*), 186
Melampus, 316
minor (*Labia*), 186, 273
nivea [*virescens*] (*Panchlora*), 187
niveus (*Pandora*), 158
orientalis (*Blatta*), 96, 186, 187
panzeri (*Ectobia*), 186
parallelus (*Stenobothrus*), 187
punctatissima (*Leptophyes*), 187
pyrenaica (*Chelidura*), 45
rhombifolia (*Dorylaea*), 20
rhombifolia (*Dorylaea*), 187
riparia (*Labidura*), 45, 186, 316
roeseli (*Chelidoptera*), 22
roeseli (*Metrioptera* [*Platyceis*]), 279
rufus (*Gomphocerus*), 187
subulatus (*Tettix*), 187
surinamensis (*Leucophæa*), 39, 96, 187
sylvestris (*Nemobius*), 188
Tetriginae, 205
verrucivora (*Tettigonia* [*Decticus*]), 279
verrucivorus (*Decticus*), 188
versicolor (*Erianthus*), 317

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[No. 536

NEW ORIENTAL PAPILIONIDÆ.

By THE HON. L. W. ROTHSCHILD, Ph.D., F.E.S.

1. *Troides goliath atlas*, subsp. nov.

♀. The cell-patch of the fore wing separated into spots; there are three white spots in front of the second median vein on the under side of the fore wing, the females of the other forms of *goliath* having less than three spots between the two median veins. The disc of the hind wing is greyish white above, and densely dusted with black, being on the under side white proximally and yellow distally.

Hab. Kapaur, Dutch South-west New Guinea. Two females collected by W. Doherty in January and February, 1897.

2. *Troides priamus arruanus*, Feld. (1859).

I have now a better series of Arru specimens of *T. priamus* than in 1895, when I published the Revision of Eastern Papilios, and am inclined to treat them as representing a separate subspecies, although only the majority of the individuals differ from New Guinean ones. Among my specimens there is a very remarkable variety of the male, which I think should be recorded under a name of its own:—

♂ *ab. chrysophila*, nov.—Hind wing, on upper side, without black spots, but instead with four brown submarginal ones, of which the upper three are centred with gold; behind the costa a large golden spot. On under side these spots enlarged, also the fourth submarginal one being centred with gold; the fore wing much more extended green than in ordinary specimens, the black distal band being only represented by a spot situated in the subcostal fork. Length of fore wing only 70 mm.

3. *Troides brookiana natunensis*, subsp. nov.

♀. Intermediate between *albescens* from the Malay Peninsula and *brookiana* from Borneo. Nearest to the latter, but the white markings larger.

Hab. Burguran, Natuna Islands.

4. *Troides hypolitus antiopa*, subsp. nov.

♂. The light stripes along the veins of the fore wing less distinct on the upper side than in the specimens from the Southern Moluccas. On the under side the second yellow spot of the hind wing is posteriorly produced, the white spot placed before the second radial vein is very small, the black one situated below the third radial large.

Hab. Northern Moluccas: Morty (=Morotai); also Halmahera (Wallace).

5. *Troides haliphron ariadne*, subsp. nov.

♂. Collar and sides of breast red, the posterior ventral segments of the abdomen edged with yellow. The vein-stripes of fore wing purer white beneath than in *iris*, Rob. (1888).

♀. Collar and breast as in male. The cell-spot of the hind wing larger than in *iris*, as are also the yellow spots situated before the first radial and behind the second median veins.

Hab. Roma.

6. *Troides oblongomaculatus asartia*, subsp. nov.

♂. Similar to *T. o. hanno*, Frnhst., from Goram. Cell-spot of hind wing extending close to the base; the subcostal spot as in *oblongomaculatus*, or smaller; the yellow patch situated below the cell reaching on under side almost as far distad as the spot situated in front of the second median vein, the cell more thinly edged with black than in *hanno*, the lobes of the black marginal band shaded with yellow, the last lobe much reduced, a small dot being separated from it; this dot absent from one of our specimens.

Hab. Ceram Laut, December, 1898 (H. Kühn). Three specimens.

7. *Troides oblongomaculatus bandensis*, subsp. nov.

Both sexes smaller than *T. o. oblongomaculatus*, with the abdomen deeper blackish brown on upper side.

♂. Hind wing rather more rounded than in *T. o. oblongomaculatus*; the yellow cell-spot large, proximally excised; the upper tooth of the third golden patch not or very little more projecting than its lower tooth; on the other hand, the yellow area more strongly produced at the first median vein than usual.

♀. Fore wing above with sharply defined greyish white vein-streaks; the subcostal streaks, and to a less extent also the others, much shaded with black distally, not extending so close to the edge as in striped females of *oblongomaculatus*; cell edged with greyish white, forming a kind of M, the cell being sharply margined with white also beneath; the stripes situated at the second median and the submedian much shaded with black. The yellow area of the hind wing above deeper yellow than in *oblongomaculatus*, beneath as pale as in that subspecies; there is always a yellow spot before the first radial, and a large one below the cell; the fringe-spots very narrow above and below.

Hab. Great Banda. A series, mostly collected by H. Kühn in November and December, 1898.

8. *Troides helena neoris*, subsp. nov.

Abdomen much paler above than in *hephæstus*, being yellowish brown, with the sides and under surface grey.

♂. Fore wing with very feeble vestiges of light streaks on the under side; the distal margin somewhat more incurved than in *hephæstus*. The black marginal band of the hind wing as broad as in extreme specimens of *hephæstus*, being much broader than in the Malayan forms of *T. helena*.

♀. All the veins of the fore wing, inclusive of the submedian, accompanied by very broad greyish white streaks, the streaks situated at the second median vein being remote from the cell; the apical third of the cell greyish white above, with two blackish streaks, beneath almost pure white. Golden cell-spot of hind wing proximally almost cut off straight; no yellow discal spot in front of the subcostal vein, the black marginal band broader than in *hephæstus*, and the fringe-spots larger. Beneath the central area of the hind wing yellowish grey, being more distinctly yellow in the centre.

Hab. Binongka, Joekan Bessi Islands, south-east of Celebes. One pair, collected by H. Kuhn in December, 1901.

9. *Troides helena mopa*, subsp. nov.

♀. Intermediate between *neoris* and *hephæstus*. Abdomen more yellow than in *neoris*, with small black spots on the under side. Fore wing as in strongly striped females of *hephæstus*. The black distal margin broader than in *hephæstus*; the central area on the under side as pale as in *neoris* at its anterior basal and posterior sides, the area being the same as in *neoris*, except that a much larger portion is yellow.

Hab. Buton, south-east of Celebes, December, 1901 (H. Kühn). Only one specimen.

10. *Troides helena antileuca*, subsp. nov.

The abdomen as black above as in *sagittatus*, not being so distinctly pale in the centre as in *helena* from Java.

♂. Fore wing entirely without light stripes on both sides. Hind wing as in *helena*; no golden discal spot before the subcostal vein.

♀. Fore wing above without grey vein-streaks, the cell also not being edged with grey; beneath the light vein-streaks faintly vestigial. Hind wing with a discal and a submarginal golden spot in front of the first radial vein, both being small; the golden spot situated behind the cell almost extends to the base; the black discal spots moderately large; the golden cell-patch cut off in the direction of the first radial.

Hab. Kangean Islands. One pair (Prillwitz).

11. *Troides helena isara*, subsp. nov.

♂. Similar to Sumatran specimens of *T. helena*; the differences not constant. The grey vein-stripes of the fore wing usually indistinct on upper side, always very distinct beneath. The yellow spot

situated before the subcostal vein of the hind wing large, as is also the one placed below the cell.

♀. Resembling *nercis* from Engano. Fore wing with sharply marked whitish gray vein-streaks, the streaks at the submedian vein broader and purer whitish grey than in Sumatran specimens, there being also two thin stripes at the submedian fold; the apex of the cell whitish grey as far down as the first median vein, the patch including two black streaks. The yellow area of the hind wing beneath paler than in Sumatran specimens, but deeper yellow than in *nercis*.

Hab. Nias. A series.

12. *Troides helena typhaon*, subsp. nov.

♂. Fore wing above without grey vein-streaks, those streaks beneath often distinct, in this case there being a whitish subbasal streak behind the median nervure. The golden subcostal patch of the hind wing always large, extending distally to the costa.

♀. Apex of cell of fore wing above edged with greyish white, this border being wider in front than behind, not being so distinctly M-shaped as in *cerberus*; the vein-stripes narrower than in *helena*, generally well developed above and beneath, those which are situated at the subcostal and discal veins extending to the cell. The black discal spots of the hind wing often very large and confluent (especially in specimens from the hills).

Hab. North-east Sumatra. A series.

13. *Troides helena spilotia*, subsp. nov.

♂. The vein-stripes of the fore wing distinct above and below, especially those which accompany the median veins; beneath there is a long and broad streak before the submedian vein, the streak situated behind the second median vein being continued basad along the cell, as in *cerberus*. Hind wing with a complete row of black spots, the second being 9 mm. long.

♀. The vein-streaks of the fore wing very dark and narrow on upper side, but strongly developed on under side; apex of cell with a dark grey M. Hind wing without a yellow discal spot before the subcostal vein; the black discal spots large, the one situated behind the second median vein long, being only 5 mm. distant from the cell; the yellow area pale beneath, greyish behind.

Hab. Hainan. One male and two females.

A FEW NOTES ON SPANISH BUTTERFLIES.

By A. F. ROSA, M.D.

ALTHOUGH my visit to Albarracin in July and August, 1906, was rather late to begin with—and short enough in any case—I was successful in obtaining most of the desirable species and varieties occurring in the district about that time of year. I arrived at

Teruel on the morning of July 29th, and proceeded by the diligence to Albarracin, the journey occupying the better part of that day, the rather primitive vehicle starting about 10.30 and reaching its destination a little before 3 p.m.

I put up at the 'Posada Nueva,' and stayed till August 9th. The weather was continuously fine, very hot in the afternoons, and the wind, which was just a cool breeze in the forenoon, generally increased in strength as the day advanced.

I had an outing with Señor Narro, who pointed out some of the likely spots for *Erebia zapateri*, although none were seen on that day; and Dr. Gimeno Márquez, from Madrid, who was shooting, accompanied me once or twice. Mr. J. S. Gibson also, who was staying at Albarracin for the summer, gave me a lot of interesting information about the place, and the customs of the natives.

The following are a few notes on the local and more important species and varieties:—

Papilio podalirius var. *feisthamelii*.—Two only, taken on the right bank of the Guadalaviar.

Argynnis adippe var. *chlorodippe*.—There was no difficulty in getting specimens of this variety, as it was abundant at some parts in the Guadalaviar district, and particularly so at the outskirts of the woods at El Puerto, and mostly in good condition.

A. pandora.—Very common on the flowery banks, and in the grassy hollows along the road beside the Guadalaviar. The large females especially were very fresh, and easily secured.

Melanargia lachesis.—Was still good, and very abundant everywhere. The shading at the base of the wings, often very slight in French specimens, is in these more distinct, often well marked.

M. iapygia var. *cleante*.—Not uncommon at El Puerto, but a little difficult to pick out from *M. lachesis*. Of *iapygia*, the first seen were worn males, but later on fairly fresh females were frequent. These vary somewhat, some having very little or none of the shaded band characteristic of the variety around the eyes, hind wing; and one has the usual dark markings of upper side very pale brownish grey.

Erebia zapateri.—In and near the woods at El Puerto. The first seen August 6th, two or three only, on 7th more frequent, and on 8th very common; but only two females were obtained. On the wing it reminded me of *E. æthiops* when it is just making its appearance, the wings having such a dark, rich, velvety bloom, which is so readily tarnished; but the wings are rounder, and the patch looks nearly orange instead of mahogany, and it is larger and more uniform. There is sometimes a third spot besides the two apical, as in *æthiops* (two males and the females). The species is generally described as having upper side hind wings "uniform brown without spots or markings," or "hind

wings without eyes"; but this is hardly the case, because of thirty males only one is without markings; the others have a rusty patch. In five this patch contains a black spot, and in eight cases a black spot with a white pupil. In one instance two pupilled eyes are present, and in two cases three. These were just the first thirty I came across. The females taken are similar to the last, having two or three on hind wing, and one additional towards anal angle of fore wing.

Satyrus priouri.—Only a short series obtained, mostly near Losilla, and rarely in the Guadalaviar district, where they were practically over. I was disappointed with the var. *ulagoris*, only getting one or two, and these were poor specimens.

S. actæa.—Two males at El Puerto, and one other seen. They seem to have just emerged, and appear very small when one is accustomed to *S. cordula*.

Lycena hylas var. *nivescens*.—At Losilla, fluttered along the middle of the path, a few inches from the ground. Some very good—indeed, quite fresh—but not common. The spots forming the P on under side fore wings are much enlarged compared with Swiss and French *hylas*. I saw no females, nor did I meet with any males of the type.

L. corydon var. *hispana*.—This pale variety was very abundant, large, and fresh. It is considerably larger than the type, and is a very striking form. There is a tendency in the male to the formation of a linear discoidal spot or streak on upper side fore wing. In the females the under side is paler than the type, and the black spots on fore wing are generally very large. In these features the female differs from the type.

Var. *albicans*.—One specimen which has the marginal peacock eyes both on primaries and secondaries clearly mapped out in brownish, and is of a decidedly whiter colour than *hispana*, is in this instance probably an aberration of *hispana*, although I suppose it occurs as a local race further south in Andalusia. It was taken in a hollow beside the road at Losilla, which was a favourite resort of many butterflies.

Var. *corydonius*.—Stray specimens of this fine blue variety were taken at Losilla, and seen in the Guadalaviar valley. The difference between this and the pale var. *hispana* is remarkable, occurring so near together.

L. admetus.—Three or four specimens and two or three of var. *ripartii* from both localities. The *L. damon* occurring along with these do not compare favourably with specimens from Aigle.

Lampides boeticus.—Was not uncommon at Losilla, and occasionally newly emerged. One male measures over 40 mm.

L. telicanus.—Several were taken near and some in the woods at Losilla.

Hesperia proto.—A few were netted, amongst which several were very perfect.

One of the "blues" which occurred rather frequently at Losilla, and which I took for *L. baton* at first, from the large black spots on under side, turned out on examination to be *L. argus* (*ægon*). As they were very worn I only brought away one male and one female. In these the spots underneath, particularly of fore wing, are unusually enlarged (noted also in var. *nivescens* and var. *hispana*) and black, and the specimens are pretty big, the female measuring 33 mm.

In addition to the foregoing, *Gonepteryx cleopatra* was seen, occasionally at first, but, like many other species, became scarce towards the end of the period. *Satyrus briseis* and *alcyone* were very common on the way up to Puerto de la Losilla, especially the former, on the heath just before reaching the farmhouse; and *statilinus*, *fidia*, and *circe* in the Guadalaviar valley.

Epinephele lycaon, *ida*, *pasiphaë*, and *Cœonympha dorus* were all observed, as well as numerous other more generally distributed species.

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NOTES ON A COLLECTION OF LEPIDOPTERA FROM ADEN AND FROM THE TRANSVAAL.

By Major A. S. BUCKLE, R.F.A.

I HAVE been asked to remodel, for publication in this journal, a list—made out three years ago—of Lepidoptera taken in 1899 at Aden, and in 1900–2 in the Transvaal.

In the course of my wanderings on military duty, nothing has been of greater interest to me, as an amateur in the study of entomology, than the distribution of the same species in localities separated by vast distances and differing widely in climate. It is thought, therefore, that the following preliminary list of those insects found both in Aden and in the Transvaal will be of interest also to others.

Danaus chrysippus, *P. cardui*, *Junonia cebreus*, *H. misippus*, *P. bœticus*, *Belenois mesentina*, and *Utetheisa pulchella* are old friends one meets with everywhere in or near the Tropics, at any rate east or south of Suez. *Parnara mathias* I took at Aden, and also at Pretoria. The beautiful "eyed" Noctua, *Cyligramma latona*, is abundant at Aden, and I believe I took it in the Transvaal, but the record is uncertain; I certainly saw it at Mosambique and at Durban.

All the above ubiquitous insects are common or abundant both in Aden and in the Transvaal.

List A includes those taken at Aden.

Nearly all the butterflies mentioned were taken among the

scanty herbage growing-- somehow--in the sand and stones of "Goldmohur Valley," which is the widest of several dry, stony torrent-beds leading down from the crags of Jabal Shamsam, the great crater-wall, to the sea. No more unpromising spot for Lepidoptera could be imagined than the barren Peninsula of Aden. Practically no herbage exists save in these valleys; there, however, butterflies swarmed. A few were taken in the cultivated ground across the harbour; but inland, even in the fertile district of Lahej, there were very few butterflies to be seen. I only remember seeing *Delias eucharis*, but did not take it.

The few species of moths noted in List A swarmed in to light in the bungalows at "Steamer Point," about May and June.

List B, those taken in the Transvaal.

In those troublous years 1900-2, there was not, as a rule, much opportunity of collecting insects in the Transvaal! At Pretoria, however, in the hot weather 1900-1, opportunities did occur. Through the kindness of Dr. Gunning and Mr. Zwierstra, of the Pretoria Zoological Gardens, I found myself armed with a net and a killing-bottle; and numerous short forays in the gardens, fields, and thickets of Fountains Grove, one and a half miles to the south, on the stony kopjes surrounding the town, and in the flower-gardens of the officer's quarters at the "Staats Artillerie" Barracks, yielded a fair return.

I again found chances of collecting while stationed at the Dynamite Factory at Modderfontein, twelve miles north of Johannesburg. This locality is 1000 ft. higher than Pretoria, being about 5800 ft. above sea-level, and is in the midst of the "High Veld." Here butterflies were not so numerous; such as were obtained were usually taken at the flowers of the eucalyptus trees, or amongst the tall grass.

Nearly all my Transvaal moths, however, were taken at Modderfontein; they swarmed in nightly to the electric lights in the factory dwellings.

The only other locality in the Transvaal where I found it possible to make any attempt at collecting was Pietpotgietersrust, in the "Bush Veld," more than one hundred miles north of Pretoria, and much lower and hotter than that place. Returning from a mission to General Plumer's force, which had just (April, 1901) opened up the Pretoria-Pietersburg Railway, and "moved on" the migratory Boer Government from its temporary seat in the Zoutpansberg, my train had to "cross," at Pietpotgietersrust, no less than *seven* trains hurrying up with troops and supplies. In the two hours of delay thus enforced, I worked the gardens close to the station. Besides several species already met with at Pretoria and swarming here, in those two hours I took *V. antalus*, *Teracolus omphale*, *ramaguebana*, *pseudetrida*, and *imperator*; none met with elsewhere. *Mylothris agathina*, too,

I took there first; one specimen subsequently at Modderfontein. It may be imagined with what reluctance I left this happy hunting-ground at the end of my two hours! The semi-tropical "Bush Veld" would well repay the collector who had time to explore it; but it was not my good fortune to hunt there again.

Besides those mentioned in List B, I had the good luck to take several undescribed moths (at Modderfontein).

N.B.—In the following lists (a) = abundant, (c) = common, and (r) = rare.

LIST A.—ADEN.

DANAIDÆ.—*Danaïs chrysippus* (a), *alcippoides*, *klugii* (c), *dorippus*.

SATYRIDÆ and ACRÆIDÆ.—Nil.

NYMPHALIDÆ.—*Pyrameis cardui* (c), *Junonia cebrene* (a), *Hypolimnas misippus* (c).

LYCÆNIDÆ.—*Polyommatus batiscus*.

PIERIDÆ.—*Terias boisduvaliana*, *Synchlora glaucanome* (a), *Belenois mesentima* (a), *Teracolus calais* (a), *phusadia*, *halimede*, *pleione*.

PAPILIONIDÆ.—Nil.

HESPERIDÆ.—*Parnara mathias*, *Hesperia adenensis* (a).

SPHINGIDÆ, SATURNIADÆ, SYNTOMIDÆ.—Nil.

ARCTIADÆ.—*Utetheisa pulchella* (c).

AGARISTIDÆ.—Nil.

NOCTUIDÆ.—*Cybtigramma latona* (a), *Agadesa materna* (a), *Manas fullonica*.

(No other families represented.)

LIST B.—PRETORIA, MODDERFONTEIN, AND PIETPOTGIETERSRUST.

DANAIDÆ.—*Danaïs chrysippus* (a).

SATYRIDÆ.—*Pseudonympha vigilans*, *narycia*.

ACRÆIDÆ.—*Acreea horta* (c), *neobule*, *natalica* (r), *aconias* (r), *rahira*.

NYMPHALIDÆ.—*Atella columbina* (c), *Pyrameis cardui* (c), *Junonia hoöpis* (c), *cebrene* (a), *Precis calescens*, *sesamus* (c), *archesia*, *ceryne*, *Catacroptera cloantha* (c), *Hypolimnas misippus* (c), *Byblia ilithyia*, *Hamamimida dædalus* (c).

LYCÆNIDÆ.—*Lucinocena bibulus*, *Uraniothauma nubifer*, *Cacyreus marshalli*, *Tarucus sybaris* (c), *Polyommatus batiscus*, *Hypolycaena philippus*, *Virachola antalus*, *Myrina ficedula*, *Zizera knysna* (c), *lucida*, *Alcides orthus* (c).

PIERIDÆ.—*Terias brigitia* (a), *Mylothris agathina* (r), *Synchlora hellica* (c), *Belenois severina*, *mesentima* (a), *Colias hyale*, form *electra* (a), *Teracolus omphale*, *omphaloides*, *eione*, *ramaguebana*, *pseudetruda*, *halimede*, *pleione*, *imperator*, *Catopsilia florella* (c).

PAPILIONIDÆ.—*Papilio demodocus* (a).

HESPERIDÆ.—*Rhapalocampa pisistratus*, *Parnara mathias*, *Parosmodes morantii*, *Platylasches ruba*, *Kedestes mohozutzo*, *Hesperia mafa*, *Eretis djelalæ*.

SPHINGIDÆ.—*Macroglossa trochiloides* (c), *Ællopos hirundo*, *Basiothea idricus* (c), *Cephonodes hylas* (c), *Charocampa celerio* (c), *schenki*,

Deilephila opheltis (c), *livornica* (c), *Thereetra capensis* (c), *Nephela funebris* (a), *Acherontia atropos*, *Daphnis nerii*.

SATURNIADÆ.—*Nudaurelia tyrrhea* (a).

SYNTOMIDÆ.—*Thyretes casta*, *Metaretia rufescens* (c), *huna*, *lateritia* (c).

ARCTIADÆ.—*Dionychopus anasis* (c), *Estigmara linea* (c), *Menas arborifera* (c), *Diacrisia lutescens*, *flava*, *Teragotona submacula*, *Carcinopodia argentata*, *Utetheisa pulchella* (c).

AGARISTIDÆ.—*Xanthospilopteryx superba* (c), *Pais decoru* (a), *Egocera fervida* (c).

NOCTUIDÆ.—*Cyhygramma latona* (a), *Sphingomorpha monteironis*, *Achea catella*, *Pandesma guenavadi*, *Metachrotis hypotenusa* (c), *accincta*, *varia*, *Euclidia dubitans* (c), *Cosmophila crosa* (c), *Megalodes pieurari*, *Cerocala contraria*, *Matopo typica*, *Tarache dispar* (c), *hyperlophia*, *tropica*, *margaritata*, *liturifera*, *natalis*, *Nuranga adnota*, *Chloridea scutuligera*, *obsoleta*, *Euxoa segetum*, *spinifera*, *epipyria*, *Migragrotis puncticostata*, *strigibasis*, *interstriata*, *Leptodemusta xantholopha*, *Spodoptera exempta*, *Perigea capensis*, *Chirippa leucosoma*, *Tathorhynchus vinetalis*, *Agrotis annularis*, *canta*, *Raghuira multi-radiata*, *Leucania promineus*, *ameus*, *tacuna*, *Baniana arborum*, *Acontia malva*, *Plusia erosoma*, *Duguria glaucinaus*, *Argyrotis pallidistria*, *Polydesma collutrix*, *Timora lanceolata* (c), *disticta*.

COSSIDÆ.—*Azygophleps asylas* (c).

NOTODONTIDÆ.—*Rugema aurifodine*, *Anthena simplex*, *Zana spurcata*.

HEPIALIDÆ.—*Gorgopsis libaneu* (c), *casta*, *bacoti*.

LASIOCAMPIDÆ.—*Odontocheiloptyx* ? *sobria*.

LIMBODIDÆ.—*Tæda detritis*.

LYMANTRIADÆ.—*Euproctis quadripunctata* (c), *nobilis* (c), *Aroa perculata*.

EUPTEROTIDÆ.—*Phala xanthosoma* (c).

ZYGENIDÆ.—*Crameria dockneri*.

GEOMETRIDÆ.—*Psilaleis crassa* (c), *Conchia nitidula*, *Tephria decenaria*, *Peridela johnstoni*, *Ostodes turbulentata*, *Nemoria* ? *attenuata*, *Ortholitha monosticta*, *pudicula* (c), *Sterranthia saccharia*, *Idæa remotata*, *spoliata*, *Epirrhoë undulosata*.

PYRALIDÆ.—*Glyphodes indica*, *Leucinodes vagans*, *orbotalis* (c), *Pagyda* sp. (c), *Lygropus* ? *nigricorius*, *Phlyctanodes fulvalis*, *venustalis*, *Zinckania fascialis* (a), *Sceliodes luisulis*.

CRAMBIDÆ.—*Ancyloloma* sp., *prepnella*, *locupletella*.

ON THE IDENTITY OF TWO SOUTH AMERICAN LYCÆNIDS.

By W. J. KAYE, F.E.S.

In the 'Proceedings of the Zoological Society for 1907' Mr. H. H. Druce has described on pp. 625, 626, and figured on plate xxxvi. figs. 22, 23, a new species of *Thecla*, viz., *Thecla politus*. This is typical *beon*, as figured by Cramer, Pap. Ex. iv.

pl. 319, figs. b, c. The pale blue colour of the hind wings, the blue streak on inner margin of fore wing, and the conspicuous red spot at the anal angle above all show most conclusively that this is the insect as figured by Cramer. Whether Cramer's insect is a constant or variable one is difficult to decide, but that *Thecla politus* = *Papilio beon*, Cram., in its figured form there can be no doubt. The synonyms given under *Thecla beon* in Mr. Druce's paper, p. 609, may or may not be synonyms of *Papilio beon*, Cram.; it would depend on whether *beon* was a constant species or not. Mr. Druce evidently considered his *Thecla politus* (= *Papilio beon*) was constant, and my own opinion coincides with his.

The *Tmolus isobeon*, Butl. & Druce, therefore would become another species, and the synonymy of the two insects would read:—

1. *Papilio beon*, Cram., Pap. Ex. iv. pl. 319, figs. b, c.
Thecla politus, Druce, P. Z. S., 1907, pp. 625, 626, pl. xxxvi.
 figs. 22, 23.
2. *Tmolus isobeon*, Butl. & Druce, Cist. Ent. i. p. 108.
Thecla bactra, Hew., Ill. Diur. Lep. p. 194, pl. 77, figs. 619,
 620.
Thecla caulonina, Hew., *ibid.* p. 188, pl. 75, figs. 587, 588.
Thecla vibulena, Hew., *ibid.* p. 190, pl. 76, figs. 599, 600, 601,
 602, 603.
Thecla bellera, Hew., *ibid.* p. 194, pl. 77, fig. 618.

In the same paper, on pp. 626, 627, the identification of *Papilio echion*, Linn., is discussed. Mr. Druce says that Dr. Butler has identified *Tmolus basalides*, Hübn., as *T. echion*, Linn., and, in *litt.*, he says: "As regards *echion*, Linn., I accept the identification again of Hewitson and G. & S., and treat *crolus*, Cram., as a synonym (of *echion*, Linn.). Dr. Butler's *echion*, Linn., I consider *basalides*, Hübn." This is unfortunate. If Mr. Druce had gone to the root of the matter he would have agreed with Dr. Butler, and found that *crolus*, Cram., does not equal *echion*, Linn., but that *basalides*, Hübn., does equal *echion*, Linn.

Linne's description of *echion* in Syst. Nat. 12th ed., p. 788, reads:—"Alis bicaudatis supra fuscis; subtus pallescentibus; fascia rufa ocelloque rubro. Roes. add. t. 7, figs. 3, 4. Alæ posticæ ad basin caudarum macula ocellari rubra."

Even by Linne's description it is obvious that *crolus*, Cram., cannot be the same as *echion*, Linn., as *crolus* has no sign on the upper side of the hind wing of "macula ocellari rubra." But as Linne refers to the figure in Roesel's addendum, there is not the least doubt left that what Dr. Butler identified as *echion*, Linn., is correct, and that *Tmolus basalides*, Hübn., is a synonym thereof, as also is *Thecla ziba*, Hew.

In Roesel's figure the orange transverse band on the under side of the fore wing is shown most distinctly curved, while in *crolus*, Cram., it is straight. The figure shows the band too near the middle of the wing, but even for *crolus*, Cram., it is not correctly placed. The figure does not show the orange spot at the anal angle of hind wing above, but this is not always present in a long series of specimens.

The synonymy thus stands:—

Papilio echion, Linn., Syst. Nat. 12th ed., i. p. 788, n. 224.

Timolus basalides, Hübn., Zut. Ex. Sch. figs. 977, 978 (1837).

Thecla basalides, Hew., Ill. Diur. Lep. Lyc. p. 156, pl. 61, figs. 412-415.

Thecla basalides, G. & S., B. C.-A. Lep. Rhop. vol. ii. p. 93 (1887).

Thecla ziba, Hew., loc. cit., p. 153, pl. 61, figs. 404, 405.

The *Papilio crolus* of Cramer remains, therefore, a distinct species.

BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES ON THE HEMIPTERA.—No. 7.*

By G. W. KIRKALDY.

I.

ALTHOUGH vol. x. of the 'Encyclopédie Méthodique' is dated 1825, Sherborn has shown that pp. 345-832 were not published till 1828. My entry (Entom. xxxiii. 265, 1900) must therefore be amended by the first citation in 1825 reading p. 1-344, and by removing thither "(α) *Globiceps* t. *capito*." The rest of the entries in the second division of Lepelletier & Serville's entry should be pp. 345-832 and dated 1828.

II.

A FORGOTTEN NOTE ON IRISH HETEROPTERA.

In the 'Entomologist,' xi. pp. 2-8 (Jan., 1878), J. A. Power furnished "A Contribution to the Entomology of Ireland" with lists of Coleoptera and Hemiptera [Heteroptera]. As the latter, comprising sixty-two species, have been overlooked by Saunders in the "Hemiptera Heteroptera of the British Islands," they are called attention to here.

III.

Hagen (Bibl. Ent. i. 457), in citing Leach's article, "Entomology," in Brewster's 'Edinburgh Encyclopædia' (1815), records

* No. 1. Entom. xxxiii. 238-43 (1900); 2. Entom. xxxvii. 254-8 (1904); 3. Entom. xxxvii. 279-83 (1904); 4. Entom. xxxviii. 76-9 (1905); 5. Entom. xxxviii. 304-8 (1905); 6. Entom. xxxix. 247-9 (1906).

reimpression in 1830, of which there is a copy at the British Museum. It does not, I think, differ from the first edition, that is, as regards the Hemiptera.

I have recently acquired an American edition in eighteen volumes, published at Philadelphia, which is said to be "corrected and improved by the addition of numerous articles relative to the institutions of the American Continent," but I cannot see that the part dealing with "Hemiptera" is altered. As I have not seen it previously referred to, and as it is not apparently in the Library of the United States Department of Agriculture,* it is as well to refer to it now. "Entomology" is discussed in vol. viii. pp. 646-758, and the Hemiptera on pp. 709-715. 1832 is the date of the entire publication.

IV.

In the 'Entomologist' for 1905, p. 307, I published what information I had then in my possession regarding the dates of publication of Burmeister's 'Genera Insectorum.' I now find further information in the 'Zeitschrift für die Entomologie,' i. 298-9 (1839).

Of the parts of the dates of which I was ignorant, it is stated that *Bythoscopus*, *Eurymela*, *Acocephalus*, and *Lystr* (sic!) were published in 1838, fascs. 1 and 2; so that the correct dates are as follows, for Hemiptera:—

Hefts 1 and 2 (1838): *Bythoscopus* (no. 10); *Eurymela* (no. 17); *Acocephalus* (no. 11); *Lystra* (no. 20) [Ed. 2, 1840-6]; probably completing heft 1; *Selenocephalus* (no. 12); *Cælidia* (no. 15); *Eupelix* (no. 6); *Jassus* (no. 14).

Heft 3 (1838): *Ulopa* (no. 3); *Dorydium* (no. 5); *Cephalelus* (no. 4); *Ledra* (no. 9).

Heft 4 (1838): *Gypona* (no. 16); *Xerophlœa* (no. 8).

Heft 5 (1840): *Paropia* (no. 7).

Heft 6 or 7 (1841): *Typhlocyba* (no. 13).

Heft 8 (1845): *Fulgora* (no. 18) [with subgenus *Pyrops*, no. 19 in Index].

V.

Fam. CICADIDÆ.

(a) Distant (1906, Cat. Hom. i. 180) cites *Tettigonia tibialis*, Panzer, as a species (unseen by him) of *Pauropsalta*. This may be (I have not Panzer's work complete), but *Tettigetta tibialis*, Kolenati, given as a synonym, is certainly not, as the figure clearly shows six apical cells in the wing.

(b) Distant (p. 167) has omitted *Cicadetta prasina* var. *cau-*

* See "Catalogue of Publications relating to Entomology in the Library of the United States Department of Agriculture," Bull. U.S. Dep. Agr. Libr. 55, pp. 1-562 (1906).

casica (Kolen. *op. cit.* pl. 6, f. 10), also (p. 38) *Cicada plebeja* var. *armeniaca* (Kolen. pl. 5, f. 1).

(c) On p. 124. for "*Cicada stercensi* (sic!), Kryn. Mus. Berol.," read "*Cicada stercenii*, Krynicki, 1837, Bull. Soc. Nat. Moscou, v. 86, pl. vi. f. 1 = *Cicada* (*Tibicina*) *stercenii*, Kolen., 1857, *op. cit.* xxx. 416, pl. vi, f. 7."

(d) On p. 167 *Cicadetta subapicalis* (Walk.) = *adusta*, Hagen.

(e) CHREMISTICA, Stål, 1870, O. V. A. F., xxvii. 714, type *viridis* (Fabr.), Stål = *bimaculata* (Oliv.) = *Diceroprocta*, Stål, l. c., type *alacris* (Stål) Stål = *transversa* (Walker) = *Rihana*, Distant, 1904, A. M. N. H. (7), xiv. 425, type *ochracea* (Walker), Dist.

Distant (Cat. Hom. pp. 32 and 38) has split the [sub-]genera *Chremistica* and *Diceroprocta*, placing part of each in *Cicada* and *Rihana*. The type of *Diceroprocta*, however, is (see Distant) a *Rihana*, as also the type of *Chremistica*.^{*} *Rihana* is therefore unnecessary.

(f) PLATYLOMIA, Stål. Distant (p. 58) says that this was not described by Stål, and was only a name in 1870! On the contrary, it was described by Stål (in the place cited by Distant), who doubtfully ascribed *flavida*, Guérin, as the type. As the *flavida* of Guérin is a *Platylomia*, and there is no reason to suppose Stål was not correct in his determination, I cannot see how *flavida* can be set aside as type, to admit *spinosa* (which is invalid in any case, as Stål places it at the head of his subgenus *Cosmopsaltria*.)

Fam. COCCIDÆ.

I have received Sanders' Catalogue of recently described Coccidæ,† which will undoubtedly be of great use. I must, however, take exception to two statements. Regarding p. 2, footnote, I did not (in my Catalogue of the Aphidæ) consider *Polyocellaria* to be an Aphid on my own responsibility; I noted that it was described as probably allied to *Orthozia*, on the authority of the 'Bericht der Entomologie,' but marked the genus with a †, signifying that I had not seen the description. I placed it among the Aphidæ on the authority of the 'Zoological Record,' usually a safe guide.

My *Eulecanium curtisii* is noted as not valid, but I cannot concur. *Coccus aceris*, Curtis, was stillborn, and cannot be resuscitated.

Fam. CIMICIDÆ.

(a) *Lamprophara bifasciata* = *Calliphara* (*Scutellera* ?) *bifasciata*, A. White, 1839, Mag. Nat. Hist., n. s., iii. 541.

* Three species are mentioned in *Chremistica*, the two last being compared to the first, which should therefore be considered the type.

† Bull. U.S. Ent. Techn. Ser., 12, pp. 1-18.

(b) *Coleotichus*, A. White, *l. c.* (misquoted by Lethierry & Severin, and in Schouteden's Monographs).

Fam. CORIXIDÆ.

Corixa contortuplicata, n. n. for *C. irrorata*, Fieber, 1851 (or 1852), not H.-S. 1850.

ON SOME RECENT BIBLIOGRAPHICAL NOTES.

BY W. L. DISTANT.

IN the last issue of the 'Entomologist' (p. 291), Mr. Cockerell writes that the species which I call *Herrera marginella* (Cat. Cicadidæ, p. 121) is based on *Cicada marginella*, Walk, but is not the *Cicada marginella*, Fabr., Syst. Rhyng. p. 96, and proposes that the species should be known by the name of its synonym, *Herrera ancilla*, Stål. It is not often that Mr. Cockerell makes a slip.

1. The species described by Fabricius (Syst. Rhyng. p. 96) is *Cercopis marginella* (*costalis*), not *Cicada marginella*. This is a well-known member of the Tettigoniellidæ (Jassidæ).

2. Walker neither supposed nor intended his species to represent that of Fabricius, which he rightly recorded in its proper place (List Hom. Suppl. p. 224 (1858)).

5. Fabricius did describe a *Cicada marginella* (Mant. Ins. ii. p. 271), but not where Mr. Cockerell quotes. This is also a well-known species of Tettigoniellidæ, and recognized and recorded as such (1854) before Walker described his species (1858). The synonymy therefore now stands:—

Herrera marginella.

Cicada marginella, Walk., List Hom. Suppl. p. 21 (1858).

Carineta ancilla, Stål, Stett. Ent. Zeit. xxv. p. 57 (1864).

Carineta marginella, Dist., Biol. Centr.-Amer. Rhynch. Hom. i. p. 21, t. ii. f. 16, a, b (1883).

Herrera marginella, Dist., Ann. Mag. Nat. Hist. (7), xv. p. 486 (1905).

Herrera ancilla, Cockerell, Entom. 1907, p. 291.

It seems a pity that Mr. Kirkaldy does not make himself familiar with his subject before writing as a critic thereon. In his note on the food-plants of some species of Oriental Rhynchota (1907, p. 282) he again breaks forth in strictural comment. He writes *Leptocoris augur* (= *Serinetha*, Dist.). Now, if Mr. Kirkaldy likes to use *Leptocoris* for *Serinetha*, no one objects; he has a right to write as he prefers, and no one is compelled to follow him. But it is inexact to write "*Serinetha*," Dist.; he gives m

too much credit. That name, as I employ it, has been previously used in the same sense by Dallas, Stål, Lethierry and Severin, and Bergroth—the last-named a purist in these matters. But if a name is changed, surely adhesion to the change should be maintained by its advocate. Mr. Kirkaldy recently pointed out, and correctly so, for it was on the authority of Stål, that *Zamila*, Walk. (1862), must be accepted as a synonym of *Pyrilla*, Stål (1859). He now, and in this note, uses the name *Zamila* himself! Some of his other animadversions have been made before and replied to by myself (Ann. Soc. Ent. Belg. li. p. 221), to which he does not refer. I therefore decline to notice them further, and consider such cavilling as outside serious entomology.

NOTES AND OBSERVATIONS.

EARLY STAGES OF AMERICAN BUTTERFLIES WANTED.—I should be greatly obliged if any reader of the 'Entomologist' would give me information which would enable me to obtain the ova or pupæ of North American butterflies, the food-plants of which are common in this country.—E. E. BENTALL, The Towers, Heybridge, Essex, December 10th, 1907.

FOE OF DRAGONFLY-NYMPHS.—Mr. A. O. Rowden, writing from Exeter, on December 16th, 1907, says that the water-boatman (*Notonecta glauca*) attacks the nymphs of dragonflies.—W. J. LUCAS; Kingston-on-Thames.

PREVENTION OF MOULD IN INSECTS.—Mr. Plum's suggestion (Entom. xl. 290) as to the prevention of mould in relaxing-boxes may possibly prove useful in some cases; but nothing could well be better than the plan proposed some years ago by my friend Mr. Woodforde, of Market Drayton, viz. a few drops of dilute carbolic acid mixed with the water used to damp the cork (or sand, if used). I have a box at the present time containing several specimens of *M. tristata*, which I took in Argyllshire early in July. The box has been frequently used since, and the cork repeatedly damped, but not a vestige of mould is perceptible on the specimens of *tristata*, and if they were worth it, I daresay I could set them to-morrow.—(Rev.) CHAS. F. THORNEWILL.

FOOD OF THE LARVA OF *ACIDALIA OCHRATA*.—With reference to Mr. Conquest's remarks as to the food of *A. ochrata* (Entom. xl. 296), I had some young larvæ years ago, which fed freely on the flowers of a hawkweed, and I think that they might possibly be reared on dandelion. My experience with *A. strigilata* corresponds very closely with Mr. Conquest's.—(Rev.) CHAS. F. THORNEWILL; Calderhall Vicarage, Whitechurch, Salop, December 6th, 1907.

ICHNEUMON FLY OPENING COCOON OF *BRYOPHILA MURALIS*.—Idling away a sunny morning, July 22nd, 1907, at Wincombe, in Somerset,

I happened to be standing near an old wall inhabited by numbers of the Hymenoptera, *Osmia rufa* and *O. caerulea*, and by the Lepidoptera, *Bryophila muralis* and *B. perla*, when I noticed an ichneumon fly alight on the wall and begin examining it. In a minute or two another of the species also settled, and the first flew away. The second one, after running about with antennae held down and vibrating, stopped near a cocoon of *B. muralis*. It bent its antennae on to the cocoon, appearing to press them down with some force, and at the same time vibrating them much more violently than before. After doing this for a short time it walked away, but quickly returned and repeated the performance from the other side. Next, it opened a small hole in the cocoon with its jaws, and pushed its head in. Apparently finding nothing, it withdrew and flew to another part of the wall. I then opened the cocoon, and found that it was of the usual double type, namely, a thin layer of particles of earth fastened together with silk, making a crack between two stones flush with the rest of the wall, and about an eighth of an inch deeper and quite separate, the true cocoon similarly constructed, which in this case contained a living pupa of *B. muralis*. The ichneumon soon found another cocoon of *muralis*, and did exactly as before, except that it pushed its head and thorax completely inside. This cocoon was an empty one. It then flew off, and fearing to lose it, I captured it. Mr. Claude Morley has identified it as a female of *Celichneumon consimilis* (Wesm.), and in his 'Ichneumonologia Britannica,' vol. i., p. 31, states that Mr. Stanley Kemp has bred several of both sexes together from chrysalids of *Bryophila muralis* (Forst.) [= *glandifera*, Hb.] at Hythe, in Kent, during September, 1901. He tells me it had not been bred before, and has only been recorded in Britain from Kent, Norfolk, Herts, and Devon, and says he has never heard of the parasite tearing open a lepidopterous cocoon, and that such a thing is unrecorded in ichneumonological annals.—E. A. COCKAYNE; 16, Cambridge Square, W.

THE BARRETT COLLECTION.—The extensive collection of "Micro-Lepidoptera" amassed by the late Mr. C. G. Barrett was broken up at Stevens's Auction Rooms on December 3rd last. From a rough casting of the figures, we find that the Tortricina (nearly 10,000 specimens) realized about £30, and the Tineina (over 14,000 specimens) something like £37. The collection was offered in 121 lots, and in all but 10 of these there were over 100 examples. 47 of the lots contained from 200 to 300 specimens; and in 11 others there were over 300, the number in one lot reaching 431. The total realized gives an average of somewhere about 5/6 per 100. In some few cases the bidding per lot fell under 2/- per 100, but in others it ranged from 8/- up to 15/- per 100. Space will not permit of much detail, but it may be mentioned that 10 specimens of *Brachytenia woodiana*, offered in sets of 5, realized 59/-. A lot of *Sciaphila*, comprising all the British species, and numbering 352 specimens, made 32/6. Lot 52, comprising 226 specimens of *Eupacilia*, including *curvistrigana* (14) and *manniana* (5), sold for 37/6. Sixteen *Argyrolepa schreibersiana* and twelve *Lozopera beatricella*, with 133 other things, brought in 28/-. For a lot comprising *Bankesia conspurcator* (two

males, two females, and two cases), *Solenobia lichenella* (nine females and cases), *S. inconspicua* (nine males, five females), *S. rockii* (three), *Teichobia verhuehella* (thirty-four), and *Diplodoma marginepunctella* (eleven, and two cases), 35/- were obtained.

THE W. J. CROSS COLLECTION.—This was also sold on December 3rd. Among the more important items were an aberration of *Argynnis selene*, with pale yellow ground colour, 115/; a cream-coloured example of *Ctenonympha pamphilus*, 22/-. Three lots of *Nyssia lapponaria*, each containing one male and three females, sold for 12/-, 8/-, and 8/-; one male and two females of the same species made 7/-. Two examples of *Lygris reticulata* brought in 15/. Sixty-five specimens of *Eupithecia*, including four examples of *stevensata*, made 10/-. Nine specimens of *Polyphlocia ridens*, one a fine banded form, and other things, went for 45/. Two lots of *Xylomyges conspicillaris* (type 1, var. *melaleuca* 2) sold for 22/- and 23/-; two other lots of the same species (type 2, var. 1) fetched the same prices per lot. One specimen of *Hydrilla palustris* (Wicken, 1906), with 18 *Phothedes capitinnula* and other species, sold for 21/. Six specimens of *Xylina conformis* (Evan John) made rather over 10/- each, and two examples of *Cucullia graphalis* (Sheldon, bred 1901) brought in a guinea. Of Tortricina there were 2572 specimens, put up in 16 lots; these sold for 56/-, or about 2/- per 100.

RAYNOR COLLECTION.—In our report of this sale (November 5th) we omitted to mention var. *varleyata*, a specimen of which sold for £4 10s. This should have been included among the highest prices given for varieties of *Abraxas grossularata* instead of var. *chalcosoma*.

CAPTURES AND FIELD REPORTS.

LEUCANIA VITELLINA IN WEST CORNWALL.—In the 'Entomologist,' vol. xxxix. p. 290, I recorded the capture in 1906 of a fine specimen of this species in West Cornwall, asking if it was not a record for the county. Mr. W. Daws replied in vol. xl. p. 40, that it was the first recorded capture, but that he had taken one in 1899, and had others in his possession taken west of Penzance, although no dates were given. I have to record having captured two other specimens this season.—W. A. ROLLASON; Lamorna, Truro, December 2nd, 1907.

CARADRINA AMBIGUA IN WEST CORNWALL.—I have this year taken wild about half-a-dozen beautiful specimens of this species, and from one of the same obtained ova which duly hatched, and are now slowly feeding through the winter. This is, I believe, the first recorded capture for the county, and seeing that the species is now regularly taken, though not commonly, in Devonshire, I think we may assume that it can no longer be considered "perhaps an occasional immigrant only," as suggested by Meyrick, but a permanent resident.—W. A. ROLLASON.

CLEORA GLABRARIA IN WEST CORNWALL.—In the 'Entomologist,'

vol. xxxviii. p. 94, I recorded what Mr. South believed to be the first capture of this species for the county. I have to record the capture of a second specimen this season, and from another locality.—W. A. ROLLASON.

LEPIDOPTERA CAPTURED IN THE KINGSTON DISTRICT, SURREY, 1907.—On August 3rd last I took one example of *Hydrelia uncula* by the side of the Penn Ponds, Richmond Park. Of *Phibalapteryx fluvialis* I obtained a male specimen in June, and a specimen of *Harpipteryx scubrella* was found on a garden fence on September 1st. A fine example of *Calligena miniata* was boxed in a tramcar at Kingston Hill.—PERCY RICHARDS; Wellesley, Queen's Road, Kingston Hill.

CAPTURES AT ELECTRIC LIGHT.—In conjunction with men employed by the Chester Corporation Electric Lighting Company I am able to record the following captures during October and November of this year (1907):—*Brachionycha sphinx*, male (2); *Dasypolia templi*, male and female (2); *Hybernus defoliaria*, male (3); *Calocampa cœolea* (2); dark form of *Ennomos tithara*, male (1); *Lithosia complana* (1); also a considerable number of other commoner species. My object in recording the above is to suggest to others interested the adoption of a similar method, and I am confident, if the prevailing weather is suitable, that the labour involved will not be in vain. I may say, in addition, that all the specimens above-named are in good condition.—ALFRED NEWSTEAD (Curator), Grosvenor Museum, Chester, December 5th, 1907.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—November 20th, 1907.—Mr. G. H. Verrall, Vice-President, in the chair. — Mr. Leonard Woods Newnan, of Bexley, Kent, and Dr. Ivar Trarärdh, of Upsala University, Sweden, were elected Fellows of the Society.—Mr. H. St. J. Donisthorpe showed, for Mr. West, examples of *Tropideres sepicola*, F., New Forest, July, 1904; *Oxytenus variolosus*, Duf., Darent Wood, March 1903; and *Apion annulipes*, Wenck, Darent Wood, 1905.—Mr. H. J. Turner exhibited cases to illustrate the life-history of *Coleophora onosmella* and of *C. bicolorella*, with photomicrographs by Mr. E. N. Clark, admirably showing the surface of the ova and the structure of the micropylar area.—Dr. F. A. Dixey exhibited several species of five African genera of Pierine butterflies for the purpose of showing the strong mimetic parallelism that existed between them.—Mr. Willoughby Gardner exhibited a remarkably small specimen of *Meloë proscarabæus*, with an example of the normal size.—Mr. W. G. Sheldon showed a case containing many examples of *Araschnia levana* var. *prorsa* and intermediates, bred from larvae found in the Department of Aisne, France, in June last. Out of 176 individuals that emerged from the pupa, 109 were var. *prorsa*;

four approached nearly to *ab. porina*, the rest were intermediate between *prosa* and *porina*.—Dr. T. A. Chapman also exhibited specimens of *Araschnia levana*, type, bred 1907, to give a fuller view of this form in assistance to Mr. Sheldon's report.—Mr. G. J. Arrow exhibited a specimen of a handsome exotic cockroach (*Doryctes rhombifolia*) found alive in the Natural History Museum, an apterous species inhabiting China, India, Madagascar, South Africa, &c., and recorded from Tropical America.—Dr. G. B. Longstaff exhibited a case containing thirty-five Ithomiine butterflies of eleven species, belonging to six genera, taken on March 20th, 1907, near Caracas, Venezuela, some 3600 ft. above sea-level. They afforded a striking exception to Darwin's principle that closely allied forms are not usually found together.—Lieut.-Colonel N. Manders exhibited a collection of some two hundred specimens of tropical butterflies belonging to the genera *Melanitis*, *Mycalesis*, *Attalla*, *Papilio*, and *Catopsilia*, which had been subjected to abnormal degrees of temperature mostly in the pupal stage. The object of the experiments was to ascertain the effect of climate on the colours of tropical butterflies.—Mr. W. J. Kaye exhibited a convergent group of Heliconine butterflies, from the Potaro River, British Guiana; he said that hitherto there had not been detected any species of Danaine or Ithomiine butterfly that might serve as a model or mimic of these species, and if at any time the large *Melinæa mneme*, or *Heliconius nimata* group, exerted any influence on these red and yellow and black species, it was unlikely that it did so now, because they had not the same flower-frequenting habit, and were not found in company with them. In illustration of his paper, "Mimicry in North-American Butterflies of the genus *Limenitis* (*Basilarchus*)," Professor E. B. Poulton, F.R.S., showed specimens of *Adelpha* (*Heterochroa*) *bradlowi*, ranging from Guatemala to Arizona, and its northern form, named *californica* by A. G. Butler, from California and Oregon. The mutual resemblances appeared to offer a notable example of Dr. F. A. Dixey's principle of reciprocal mimicry.—Mr. H. St. J. Donisthorpe read a paper "On the Life-history of *Lomecosus strumosa*, F."

December 4th.—Mr. C. O. Waterhouse, President, in the chair. — Mr. Walter Feather, of 10, Station Grove, Cross Hills, Keighley, Yorkshire, and the British Somaliland Fibre and Development Company, Berbera, Somaliland, British East Africa; and Mr. Rupert Wellstood Jack, Assistant Entomologist in the Department of Agriculture of the Cape of Good Hope, Cape Town, South Africa, were elected Fellows of the Society.—Dr. G. C. Hodgson, introduced by Dr. T. A. Chapman, exhibited a number of examples of *Anthrocerus trifolii*, collected on the same ground in Sussex, and showing a wide range of variation, including three fine melanic forms, and several showing six spots on the upper wings.—Mr. W. J. Kaye showed a specimen of *Papilio thous thous*, with the central portions of both tails removed apparently by a narrow-billed bird. The injury appeared so symmetrical that it was thought likely that the specimen was an abnormality. But a careful microscopical examination showed this not to be the case. With it were several species of butterflies from British Guiana, with injuries to the wings in the region of the abdomen, such injuries to Danaine

butterflies being quite rare. —The President showed two photographs of an African locust, which had apparently caught a mouse and was preying upon it. The specimen was found in the Congo State. —Mr. R. S. Bagnall exhibited and read notes on many rare species of Coleoptera, Thysanoptera, and Aptera, from Northumberland, Durham, and Scotland, of which ten were new to Britain. —Mr. W. L. Newman exhibited a long and varied series of *Ennomos autumnaria* (*abiezaria*); a series of *Polia xanthomista* (*nigrocincta*) bred from ova and fed on carrot, the specimens unusually large (North Cornwall); three pairs of hybrid *Notodonta ziczac* male \times *dromedarius* female = *newmani* Tutt; three fine *Xylina conformis* bred by Evan John, South Wales; three cocoons, *in situ*, of *Dicranura bicusps* collected wild in Tilgate Forest; and a fine melanic male *Oporabia dilutata* from Bealey Woods—the first melanic specimen of the species reported from Kent. —Dr. F. A. Dixey exhibited male and female specimens of a new *Belenois* allied to *B. zochalia*, Boisdu, but quite distinct from the *zochalia* group. These were captured by Mr. Wiggins in the Tiriki Hills, north-east of the Victoria Nyanza. —Professor E. B. Poulton, F.R.S., made a communication on the natural enemies of *Bombyx rubi* in Scotland, and read a note in further illustration of his remarks at the last meeting on the convergence of *Linnaeus* (*Basilearchia*) in America. —Mr. J. C. Moulton read a note on "The Rest Attitude of *Hyria auroraria*." —Mr. A. H. Swinton communicated a paper on "The Family Tree of Moths and Butterflies, traced in their Organs of Sense." —Mr. E. Meyrick, B.A., F.R.S., F.Z.S., communicated a paper on "Notes and Descriptions of *Pterophoridae* and *Orneodidae*." —Mr. R. Shelford, M.A., C.M.Z.S., F.L.S., read a paper entitled "Studies on the *Blattidae*." —The Rev. K. St. A. Rogers, introduced by Professor E. B. Poulton, F.R.S., read a paper entitled "Notes on the Bionomics of British East African Butterflies," and exhibited many examples collected by him and from the Hope Museum, Oxford, to illustrate his remarks. —H. ROWLAND-BROWN, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —November 14th, 1907. —Mr. R. Adkin, President, in the chair. —Mr. Hugh Main exhibited imagines of *Charaxes jasius* bred from ova sent him from the Continent. —Mr. Newman, series of (1) *Plusia bructea* captured in Aberdeenshire; (2) *P. chryson* (*orietacea*) bred from Cambridgeshire larvæ. —Dr. Hodgson, a series of varied *Spilotes palealis* from Dover; specimens of *Plebeus argus* (*argus*) destitute of orange markings on the upper sides; several aberrations of *Agriades corydon*, including ab. *semisyngrapha* and instances with no orange markings; *A. bellargus* forms without orange on the hind wings; and a series of *Urbicula comma* from Clandon, including pale and dark forms and a beautiful cream-coloured aberration. —Mr. H. Moore, a specimen of *Xyllocopa violacea*, captured alive in the London Docks. —Mr. R. Adkin, for Mr. C. E. Young, a *Sirex juvenis* found at Rotherham. —Dr. Chapman, specimens of *Oreopsyche pyrenæella* bred from cases collected at Gavarnie, July, 1907. —Mr. R. Adkin read a paper, "Notes on *Porthesia chrysorrhæa*," and exhibited a selection of those bred by him from Eastbourne.

November 28th.—The President in the chair.—The Annual Exhibition of Varieties. —Mr. Austin, of Highbury, was elected a member. —Mr. E. C. Goulton exhibited a very varied bred series of *Hypsipetes sordidata* from Surrey localities, and two male *Cosmotriche potatoria* of the pale female colour, captured at Wicken. —Messrs. Harrison and Main, (1) series of *Odontopera bidentata* bred from black Yorkshire parents, from dark Yorkshire parents, and from a very light Wisley female, with numerous collected specimens from many localities, and compared the variations shown; (2) four broods of *Pieris napi* bred from females from the Klein Scheidegg Pass, Switzerland, and remarked on the var. *bryoniae* forms obtained. —Mr. Tonge, (1) a bred series of *Grapta c-album*, from ova laid by a female taken by Mr. Barraud in the Wye Valley, and gave notes on the variation produced, including var. *hutchinsoni*; (2) a series of *Dipterygia scabriuscula*, taken in his garden at Reigate; and (3) a series of very good stereographs of entomological subjects by himself. —Dr. Hodgson, a series of *Anthrocera trifoli* from Sussex (one locality), including var. *hippocrepidis* and ab. *obscura*?, typical of the results of four days' collecting by Mr. Grosvenor and himself, and gave notes on the selective processes used and the results of their observations. Mr. Scollick, varieties of *Abraxas sylvata*, including a broad dark-banded form, a smoky form almost devoid of markings, forms approaching var. *pantaria*, and one with an entire absence of ochreous—all from Bucks. —Mr. Newman, (1) a fine melanic *Oporabia dilutata* from Kent; (2) long series of *Melitica artemis* from various English and Irish localities; (3) very varied series of *Notodonta chaonia* from Irish and Scotch localities; (4) hand-paintings of sundry forms bred by him during the season; and (5) three wild cocoons of *Cerura bicuspis* from Tilgate Forest. —Mr. Grosvenor, picked series of *Polyommatus icarus* from various localities, chiefly North Downs, and gave notes on the aberrations. —Mr. W. J. Lucas showed the following varieties of dragonflies from the New Forest: *Pyrhosoma nymphula* var. *aneatum* female, *P. tenellum* var. *aneatum* female, and *P. tenellum* var. *ruberatum*. —Mr. Turner, the life-histories of *Coleophora onosmella* and *C. bicolorella* from Surrey and Kent localities. —Mr. Pratt, a short series of *Mellinia ocellaris* captured in Surrey on sugared leaves of black poplar. —Mr. Edelsten, specimens of *Nigeria andreniformis*, bred from collected pupæ, with the ichneumon *Meniscus bilineatus*. Messrs. F. and H. Campion, (1) the rare grasshopper, *Chelidoptera roeselii*, from Herne Bay; and (2) the dragonflies *Sympetrum sanguineum* from Epping Forest, September 15th, *S. scoticum* from Esher, September 3rd and 20th, the last small, and the female of *Cordulia aenea* from Epping Forest. —Mr. J. Alderson, (1) short series of *Melitica aurina*, bred from Cumberland, much undersized and darker than usual; and (2) *Melanpias epiphron*, three second-brood specimens bred from ova laid by a Honister female; the remainder of the brood hibernated. —Mr. Garrett, *Argynnis adippe* from Arundel, and *Anticlea sinuata* from the same place. —Mr. Andrews, varieties of Diptera, (1) *Cyrtoneura stabulans* with an extra cell in each wing; and (2) specimens of *Syrphus* and *Platychirus* lacking the usual yellow abdominal markings. —Mr. South, for Mr. Pope of Exeter, (1)

male *Epinephela ianira* measuring only 38 mm.: (2) a pale ochreous brown female of the same species; (3) a male with a symmetrical pale ochreous blotch on each wing and with white fringes; and (4) a *Eubolia plumbaria* with dark purplish slate-coloured fore wings with ochreous edged transverse lines; and, for Mr. Haynes, an aberrant example of *E. tithonus* with the usual fulvous markings, but with the marginal areas whitish instead of dark brown. The last was from Salisbury, the first four from Devonshire.—Mr. Edwards, *Urama leilus*, with a coloured plate, showing the life-history of this gorgeous Jamaican moth.—Mr. F. Noad Clark, with the microscope, ova of several species of *Coleophora* and preparations of the ova to show the structure of the micropylar area.—Dr. Chapman, Lepidoptera collected in the Pyrenees, including *Lycena orbitulus* var. *oberthuri*, *Erebia lappona* var. *sthenyo*, *E. lefebrei*, *E. gorge*, *E. stygne*, *E. ome*, *E. cecilia*, *E. tyndarus* var. *dromus*, *Oreopsyche pyrenælla*, and *Marasmarcha luttodactyla*.—Mr. R. Adkin, (1) specimens of *Tortrix pronubana*, bred from spring larvæ; (2) *Melanippe fluctuata*, with the transverse band reduced to a mere speck; (3) *Agriades corydon*, females from Eastbourne, with more or less well-defined blue scaling, (4) a dark-suffused *Boarmia roboraria*; and (5) forms of *Abraxas grossulariata* with yellow-shaded ground.—Mr. Schoon, *Apona eratacyi*, *Tapinostola bondii*, *Bryophila glandifera*, and *Sesua chrysuliformis*, from East Kent.—Mr. Willsdon, numerous species of Lepidoptera, including gynandromorphous *Crocallis elingvaria* from Manor Park, *Heliothis peltigera*, dark and light *Catocala sponsa*, and *C. promissa*, &c.—HY. J. TURNER, Hon. Report. Sec.

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—November 5th.—Dr. T. A. Chapman exhibited a living male *Cleogene pelctieraria* bred from ova laid in August, a species occurring only in the Pyrenees and the Cantabrian Mountains. Dr. Chapman pointed out that the unexpected throwing of a second brood by a single-brooded Alpine species had been paralleled in *Erebia cassiope*.—Mr. J. A. Clark, *Peronea cristana* vars. *ruficostana* and *albocostana*.—Mr. H. M. Edleston, *Abraxas grossulariata* ex Raynor collection, with fasciated hind wings.—Mr. W. Bloomfield, various Lepidoptera taken at Finchley during 1907, including *Bombycia ocularis*.—S. J. BELL, Hon. Sec.

RECENT LITERATURE.

The Moths of the British Isles. By R. SOUTH, F.E.S., &c. (Series I.—Wayside and Woodland Series.) Pp. 343, pl. 159 (96 coloured, with 671 figures). London and New York: F. Warne & Co. 1907. 7s. 6d. net.

THIS book is uniform with 'The Butterflies,' noticed in 'Entomologist,' 1906, p. 166, and is even more marvellous in so far that for an increase of one quarter in cost it gives half as many more coloured plates, and more than a corresponding increase in text. It

includes the Sphingidæ, Arctiadæ, Lymantriadæ, Nolidæ, Chlœophoridæ, Notodontidæ, Lasiocampidæ, Cynatophoridæ, Saturnidæ, Endromidæ, Drepanulidæ, and a large part of the Noctuidæ.

The coloured figures are by three-colour process, the majority from the insects themselves; with some inequalities these are all of a very satisfactory character, so that the tyro ought to have no difficulty in naming his captures. They are certainly more true to nature than most of the plates in "Barrett," costing about ten times the price, and though the specimens are not so perfect or so well set as Mr. Horace Knight shows them in the fifteen plates from his drawings, nor so pleasing to an artist, they are equally good as illustrations of the species; everyone knows the excellence of Mr. Knight's drawings.

The "Butterflies" gave us an outline of the earlier stages in nearly every instance; this is carried out here only with the earlier families, Sphingidæ, Notodontidæ, &c., only a few species being selected for illustration in the Noctua, &c. On the whole, these black-and-white illustrations are good, but some eggs (as Arctiads, with too flat a base) are open to criticism, and the larva of *A. caca* (which even Buckler refrained from attempting) is no better than some other figures of it we have seen. Where nearly all are excellent, it is perhaps merely personal taste that suggests pl. 33 (with *cucullina* and *carmelita*) or pl. 36 (*batis*, *ocularis*, &c.) as especially pleasing and good.

The book cannot but be useful to any lepidopterist, but is especially addressed to nature lovers in general; for either, we think, it would have been better to have given the Latin names on the plates, and to have added the reference to the page where it is described, this being often at some distance from the plate, introducing a difficulty that did not arise in the "Butterflies," where only sixty-eight species were treated of, whilst here are three hundred and thirty-five. As to the Latin names, it is extremely desirable these should come first, since their scientific character has a quality that must appeal to the most British neophyte, *viz.* it affords a key to immense stores of recorded facts, any one of which he may wish to ascertain. We much doubt the general prevalence of a preference for English over Latin names, and whether there exists one individual who knows the English names in this volume for fifty who know the Latin ones. Unfortunately the book is so excellent and so cheap that this state of affairs may be altered, and unquestionably to the discomfort of those who continue the study and find they have to learn the Latin names also. On p. 158 Mr. South tells us that *D. russula* has now to be called *santo*, a fact he regrets. Though we are sure it is unfounded, a suspicion arises that, in exhibiting an occasional weakness of the Latin names, he desires to recommend the name under which he describes the species, "the Clouded Buff."

We can find no other than very trivial points that are open to criticism, unless we may include some dissatisfaction that, for our individual benefit, so trustworthy and, within its limits, so complete a work, with such excellent figures and so small a price, did not appear some forty years ago.



Photo by Carson & Co

MARTIN JACOBY, F.R.S.

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MARTIN JACOBY, F.E.S.

WITH the greatest regret we have to record the death of our valued colleague Martin Jacoby, who passed away on December 24th, 1907. When the late Mr. John Henry Leech acquired the 'Entomologist' in 1889, Mr. Jacoby was one of the six specialists who promised their support and consented to act on the Reference Committee of this Journal. Since that time papers on new species of Phytophaga described by him from many parts of the globe have appeared in almost every volume of the publication. Among quite his latest work on this group of the Coleoptera are the descriptions of novelties in the present number, the proof of which he had read and marked for press a few days only before he died.

Mr. Jacoby was born on April 12th, 1842, in Altona, near Hamburg. His boyhood was spent amid poor surroundings in the vicinity of the port of Hamburg. Later on he entered the office of a leather merchant, but the occupation and associations were not in the least adapted to his temperament. In those early days, even as they continued to the end, a love of music and a yearning for the study of Natural History were dominant notes in his life. Advantage was taken of every opportunity that occurred of setting out on a collecting foray, or of attending wherever military or other bands might be heard. Having studied the violin for a number of years he, when about twenty years of age, relinquished the leather business and came to England, when he became a member of Sir Charles Hallé's orchestra then in Manchester. Subsequently he came to London, and joined the orchestra of the Royal Italian Opera. Whilst holding this position he formed a connection as a teacher of his favourite instrument, the violin, and he decided to make London his home.

Before leaving Germany he had commenced to form a collection of birds and insects, but on the advice of the late Edward Hargitt, an authority on woodpeckers, to confine his attention to

some particular group or family of insects, he decided that he would study only the phytophagous beetles. Thus it was that he formed an extensive collection of, and became the acknowledged authority on, this group of the Coleoptera. It would be difficult to estimate, even approximately, the large number of species, procured from all parts of the world, that he has made known to science.

Besides numerous papers published in the 'Proceedings of the Zoological Society,' 'Transactions of the Entomological Society of London,' and in the organs of various learned societies abroad, he was the author of two volumes on Phytophaga in 'Biologia Centrali Americana,' and had just completed a volume on the same group of insects for the 'Fauna of India.' The latter work he had seen through the press, but unhappily was fated not to see it published.

Ever willing and eager to assist in the identification of those insects he understood so well, and of which he had such expert knowledge, he had determined, and where needful described, the phytophagous material in the principal museums and private collections of the world.

Mr. Jacoby was elected a Fellow of the Entomological Society of London in 1886, and he was also a member of several Zoological and Entomological Societies on the Continent. For many years past he was a welcome guest of the Entomological Club, at the annual supper given by Mr. Verrall, and on these occasions he contributed greatly to the pleasure of the evening by his beautiful violin solos. His many amiable qualities endeared him to those with whom he came in contact, in the scientific as well as in musical spheres, and his departure will be deeply regretted by many who have lost a good friend. He leaves a widow, two daughters, and a son.

DESCRIPTIONS OF TWO NEW GENERA AND SPECIES OF AUSTRALIAN EUMOLPINI (COLEOPTERA PHY- TOPHAGA).

BY MARTIN JACOBY, F.E.S.

AGETINELLA, gen. nov. (Eumolpini).

Shape oblong, head perpendicular, forming a plain surface without depressions, clypeus not separated from the face, eyes oblong, entire; antennæ short, the basal two joints thickened, the second one-half shorter than the first, third to sixth joint thinner, equal, the others thicker and more elongate. Thorax transverse, short, sides feebly rounded, posterior margin concave at the sides, median lobe rather pointed, the angles obtuse. Scutellum broader than long, small. Elytra narrowly oblong, lateral lobes absent, surface punctate-

striate. Legs rather short and stout, femora unarmed, tibiae widened posteriorly, entire, first joint of posterior tarsi about as long as the following two together; claws feebly appendiculate. First abdominal segment as long, or nearly so, as the other segments together. Prosternum very narrowly elongate, mesosternum oblong, slightly broader. Anterior margin of thoracic episternum concave.

This genus, proposed for another very minute Eumolpid, presents another of those transitional forms so frequently found in the Australian Continent, and almost impossible to place satisfactorily in or near any other group. The structure of the head and the long abdominal first segment are almost unique amongst the Eumolpini, where the species is, moreover, one of the smallest of this subfamily.

Agetinella minuta, sp. nov.

Fuscous, with pale elytral apex, or elytra entirely pale. Head and thorax nearly black, antennae and legs fulvous.

Head minutely granulate and impunctate; antennae scarcely extending to base of thorax, fulvous. Thorax nearly three times broader than long, sculptured like the head, opaque, with some extremely minute punctures at sides and base. Elytra not wider at base than the thorax, finely and closely punctate-striate, the interstices narrowly longitudinally costate and shining. Body beneath nearly black; legs fulvous, as well as apex of last abdominal segment. Length, $1\frac{1}{2}$ mm.

Hab. Swan River (Lea).

Of the two specimens kindly sent by Mr. Lea, one has the elytra testaceous, the other dark fuscous, with the apex gradually getting paler.

PLATYCOLASPIS, gen. nov. (Eumolpini).

Body elongate, glabrous; eyes entire; antennae short, first and second joints thickened, the following three joints thinner and longer, the rest subtriangularly thickened, very short. Thorax nearly twice as broad as long, with narrow flattened lateral margins, these subangulately produced at the middle, the surface with a transverse median sulcus; scutellum narrowly oblong. Elytra not wider at the base than the thorax, the sides very strongly deflexed, surface irregularly punctured. Legs slender and elongate, femora unarmed, tibiae not emarginate at apex, tarsi short, nearly equal, subtriangular; claws appendiculate. Prosternum and mesosternum very narrow and elongate; the anterior margin of the thoracic episternum slightly concave.

This genus is proposed for the reception of a very small species, which would enter the Eumolpid group of Colaspini of Chapuis's arrangement; from any of the genera placed in that group the Australian genus is at once distinguished by the short, submoniliform antennae, and the extremely narrow prosternum and mesosternum.

Platycolaspis australis, sp. n.

Pale testaceous; head obscure fulvous; the apical joints of the antennae and the tarsi more or less fuscous; thorax opaque, finely granulose-punctate; elytra strongly and very closely punctured, interstices finely, transversely wrinkled, the sides with a narrow longitudinal ridge. Length, 2 mm.

Head very finely rugose, dark fulvous, opaque, sometimes with a central dark spot or stripe; maxillary palpi slender, apical joint pointed; antennae extending beyond the base of the elytra in the male, shorter in the female, lower five or six joints pale, rest fuscous. Thorax short and transverse, the surface finely granulate or rugose, opaque, distinctly sulcate at the sides, interior of the sulcus often darkened. Elytra more shining than the thorax, very closely and strongly punctured, the punctures more regularly arranged in rows from the middle downwards, the interstices anteriorly transversely wrinkled; a more or less distinct narrow ridge runs downwards from the shoulders to near the apex. Legs rather darker; metasternum often stained with piceous, shining and impunctate.

Hab. Hobart, Tasmania (Lea).

AN ENTOMOLOGICAL VISIT TO NORTH QUEENSLAND AND TO NATAL.

BY HUBERT W. SIMMONDS, F.E.S.

I LEFT Wellington on Christmas Day, 1906, by the turbine steamer 'Maheno' for Sydney, where I caught the Howard Smith boat (steamship 'Bombala') for Townsville. Brisbane was reached on the 30th, where we had a couple of days. I spent some time in the Botanical Gardens, where I found the beautiful larvæ of *Euplœa corinna*. This larva is very conspicuous, having three pairs of long black protuberances on the first three segments, and also another pair on the next to the last segment. The pupa of this insect is one of the most lovely objects I have ever seen; the first day it is all pale green, but it quickly changes into a delicate mother-of-pearl, striped with three rows of burnished gold on each side, and also having five small brown dots on either side. Other butterflies noticed here were *Papilio sarpedon*, *Charaxes sempronius*, *Hypolimnas bolina*, *Acræa andromache*, *Danis taygetus*, and a species of *Delias* which I did not get close to; also *Neptis shepherdi* and worn *Papilio ægeus*.

From Brisbane we had a pleasant run north to Townsville, passing several schools of porpoises, and threading our way through the beautiful green islands which line the coast inside the great Barrier Reef. Townsville was reached on January 4th, 1907. Here it was very hot and dry, and my results during the

few hours I was there were very disappointing. Several species of *Catopsilia* were very abundant, but most difficult to catch. *Eurycus cressida* was fairly numerous, as also was *Hypolimnas missippus*, the males far exceeding the females. The females seemed much slower in their flight, and had a habit of settling in the long grass, which made them easier to catch when found, but more difficult to discover unless trodden up. *Acræa andromacha* and *Danaïs petilia* were fairly common, whilst I noticed single examples of *Hypolimnas bolina* and *Junonia albicincta*.

At Townsville I transhipped into the little coastal steamer 'Lass o' Gowie' for Cairns. She was very small and slow, and had very little shelter from the sun and rain, whilst she carried far more passengers than she had cabin accommodation for. As a result most of us had to sleep on deck. It was a night I shall not easily forget—men, women and children, Chinamen and whites, all huddled up together, whilst forward were crowds of cane-cutters, black, white, and yellow; and when towards midnight a tropical deluge descended our misery was complete. Cairns was reached on Sunday the 6th, and in the afternoon I went out after insects. The heat was intense, it being just before the rains; but everything was new. On a dead tree on the sea-front I found many pretty little red and white striped Brenthids. At a spot where a marsh ran through the bush butterflies were fairly numerous. Here I took many specimens of that lovely Lycænid, *Arhopala amytis*.

The next four days were spent in the dense scrub lying between Cairns and the Barron River. Mosquitoes were very troublesome wherever there was any stagnant water, but at Freshwater, where there is a pretty little running stream, they gave no trouble. Here the magnificent *Papilio ulysses* was quite common, and on one day I took fourteen perfect examples. It is a grand sight to see this insect, a mass of black as it descends to the decoy from the tops of the highest trees, then suddenly turning and flashing all its dazzling blue in the sun, and after hovering for a moment returning whence it came. That grand butterfly *Ornithoptera cassandra* was to be seen constantly, lazily flopping in and out of the shady scrub. This butterfly has a habit of flying in the rain, and is generally to be seen at dusk, looking almost like a bird, and long after all other butterflies have retired for the night. Another beautiful insect in these low-lying scrubs was *Cethosia cydippe*, which is one of the most conspicuous butterflies I know, but this was far less common than the former insects. *Doleschallia australis* was very common, but difficult to get in good condition. The resemblance of the under side of this insect to a dead leaf is almost equal to the well-known *Kallima inachis*. *D. australis* has a habit of frequently settling amongst the dead leaves and twigs which cover the ground, but it also very often settles on leaves high up on the

lower trees. *Papilio sarpedon* was frequently taken at mud-holes, as *P. ulysses* was also once or twice. *P. lycaon* was noticed and stopped once as it flew swiftly overhead, following the course of a swamp. *Cynthia ada* was quite common, the males far outnumbering the females. Here also I obtained *Neptis shepherdi*, *Precis zelima*, *Neptis consimilis*, *Cupha prosopis*, and *Tellervo zoilus*.

Amongst the beetles, *Cicendela semicincta* was very common on the paths, whilst there were two or three arboreal species on the tree-trunks, but of these I only managed to capture a few of one species (*D. flavipes*). They have a habit of moving round the tree as one approaches, and are most difficult to take. I was late for Buprestidæ, and only took one or two species. There are still a few black fellows about in this district—poor little undersized specimens of humanity. One day I met one armed with a spear and boomerang, and on another occasion one had a boomerang and a throwing-stick of some kind. Their huts are the roughest shelters I ever saw, and far too low for one to stand upright in. They simply consist of three long wands bent over in half circles, and crossing at a point at the top, and then loose thatch is roughly thrown over them.

At the end of the week I went up to Kuranda, above the Barron Falls, which lies nearly two thousand feet above sea-level. Here the bush takes a very different character, the dense undergrowth giving way, and one also misses the graceful Australian palm (*Livistona australis*); still the lawyer palm (*Calamus australis*), a climbing species armed with long tentacles studded with hooks, is as numerous and troublesome as ever. *Ornithoptera cassandra* was common here in all stages as below, but at this season *Papilio ulysses* seemed less numerous. I also took *P. agamemnon*, and one afternoon a large number of *P. macleayanus*. *Tellervo zoilus* was also very common, and, like *Ornithoptera cassandra*, does not seem to mind the rain. It is mimicked by the very rare little *Neptis staudingfreana* and one afternoon I was fortunate enough to capture three examples.

The rain was now descending daily, rendering collecting very difficult. A fresh source of annoyance appeared in the shape of small pencil leeches, which are very common in some parts of the bush. They fix themselves on to the clothing of passers-by, and one is not aware of their presence till one notices the blood-soaked garments. It is curious here to hear the chorus of frogs, which commences of an evening or just before rain sets in. Wasps are numerous up here, making their nests underneath the stairs (which are outside) and under the roofs of the balconies. They do not seem to cause any annoyance to the inmates. In the garden I met our old friend *Deiopeia pulchella*.

Other butterflies captured included *Hypolimnas alimena*, *Junonia vellida*, *Mynes geoffroyi*, *Danaïs hamata*, *D. chrysippus*,

Deudorix diovis, *Bindahassa sugriva*, *Megisba nigra*, whilst *Danis serapis* was very abundant. Many other Lycænidae and also Hesperidae were taken, but I have not yet identified them. Small ants were very troublesome here, attacking larvæ, pupæ, and perfect insects at every opportunity. Beetles did not seem so much in evidence as I had expected, but I took a beautiful pair of the magnificent *Phalacrognathus muelleri*. Round a large tree with a lilac-coloured flower were many green *Lomaptera duboulayi*, and I also obtained a few Longicorns. Whilst at Kuranda, Mr. Dodd kindly showed me some of the magnificent insects which he collects in this district.

On my return southwards I again called at Townsville, where I found things very different. Heavy rains were falling, and on the paths were swarms of *Cicendela semicincta* (both forms), where previously not one was to be seen. Birds, too, seemed more numerous, and I was particularly interested in some bee-eaters which were numerous along a watercourse which I followed.

I arrived at Sydney on February 1st, and paid a visit to the National Park. Although the wild flowers are extremely varied and beautiful here, there were very few butterflies and practically no beetles at this season to be found. The only butterflies noticed were species of *Xenica* and *Heteronympha* (*H. merope*), and one or two dull Lycænidae. From February 4th to 9th I was in Melbourne, but only two species of *Xenica* were taken, although I visited one of the best localities in South Victoria. Perhaps I should have done better here but for the rain, which interfered with outdoor work very considerably. During my whole stay in Australia constant rain handicapped me severely in outdoor work, whilst it rendered it very difficult to dry specimens and to prevent mould.

I left Melbourne (February 9th) by the steamship 'Salamis' for Durban, where we arrived on March 5th after a rough and dreary passage. Here I was particularly anxious to obtain some of the beautiful instances of mimicry which occur in this locality, and on the whole was very successful. On the first afternoon I went up the Berea, and into the Stella Bush, where I found insect-life apparently far more abundant than in any part of Australia, although one missed the gorgeous beauty of *Papilio ulysses* or *Ornithoptera cassandra*. Flowers are also far more conspicuous than in the Queensland scrubs, but the country seemed dustier, and lacked the fresh green of the palms, lawyers, &c., so familiar in the tropical jungles of Northern Australia. One of the commonest butterflies here was *Pieris thysa*, but, strange to say, its model, *Mylothris agathina*, was quite scarce here, although I subsequently found it abundant enough up country. Another interesting butterfly which was unusually common was *Pseudacraea tarquinia*. This was to be taken daily

both here and later at Eshowe (Zululand). I obtained a beautiful example of *P. imitator* at Eshowe, where I also found *Eronia argia* not uncommon. *Papilio cenea* was very abundant, and I obtained all three forms of its female at Durban. Another fine mimic of which I obtained a few examples was *Euralia wahlbergi*, but I was evidently late for this insect, as most of my specimens were worn.

At Pietermaritzburg I found *Hypolimnas missippus* fairly common, and also took a very fine female at Amanzinitoti. In the South African bush are many grassy clearings, where the beautiful purple- or orange-tipped butterflies of the genus *Teracolus* swarm amongst the flowers, whilst such lovely *Lycænids* as *Iolus silas*, *I. sidas*, and *Deudorix diocles* are to be found amongst the stunted bushes which edge such clearings. The curious flat-topped acacias which so largely constitute the larger vegetation of South Africa were the haunt of many fine *Charaxes*, attracted by the gummy sap so frequently exuded from wounds on the branches. In such places I captured *Charaxes zoolina*, *C. neanthes*, *C. varanes*, *C. brutus*, *C. ethation*; whilst at Eshowe I also obtained *C. candiope* and *C. xipares*. Other butterflies which swarmed in such localities were *Crenis boisduvali* and *C. natalensis*, and I also found amongst them a few Coleoptera, with which was *Endicella smithi*. A feature of the South African bush is the numerous paths going in all directions, and here were to be obtained the two *Cicendelidæ*, *C. clathrata* and *C. disjuncta*, the latter haunting the more shady spots.

In the darker portions of the bush *Melanitis leda* was common, whilst once or twice *M. diversa* was also taken. Towards the end of March *Salamis anacardii* became quite common, and I also obtained two *S. nebulosa*—the one at Durban (March 15th), and the other at Eshowe (April 1st). Quite a feature of the bush here were the beautiful fruits—scarlet, yellow, or purple, some smooth and others covered with spines—which grew on the creepers which trailed over every bush; whilst a newcomer could not help but be attracted by the monkeys, families of which were to be met with daily, anywhere where there are any trees left. Amongst the many butterflies haunting the native paths in the Stella Bush I noticed *Neptis agatha*, *N. gooichi*, *N. marpessa*, *Eurytela hiarbus*, *E. dryope*, *Hypolycæna phillipus*, *Pentila tropicalis*, and many species of *Acraea*; whilst on the lantana bushes which grow round the edge of the bush were swarms of *Papilio demoleus*, *P. lycæus*, *P. brasidas*, and *Junonia clelia*. Up country *J. cebrene* was very common, and I took one specimen of *J. boopis* at Acooca. At this latter place I found *Teracolus auxo* extremely common along the roadside, together with a few *Eronia leda*.*

* In one garden on the Berea I took a nice series of *Myrina demaptera* which were quite abundant in one tree, frequently settling on the under sides of the leaves.

SPECIAL INDEX.

New Genera, Species, and Varieties are marked with an asterisk.

COLEOPTERA.

- ædilis* (*Acanthocinus*), 298
ænea (*Anomala*), 165
æneus (*Paracymus*), 298
angusticollis (*Anchomenus*), 165
arenaria (*Ægialia*), 107
arenarius (*Bledius*), 165
arvensis (*Cicendela*), 165
asparagi (*Crioceris*), 232
astragali (*Apion*), 22
ater (*Ocypus*), 165
atroapterus (*Otiorrhynchus*), 166
aurata (*Celonia*), 165
**australis* (*Leasia*), 148
australis (*Leasia*), 167
banksii (*Chrysomela*), 166
betuleti (*Byctiscus*), 191
bipunctatus (*Cryptocephalus*), 298
bipustulatus (*Badister*), 165
bipustulata (*Tritoma*), 165
blattariae (*Cionus*), 166
brevicornis (*Dendroctonus*), 47, 160
cadaverina (*Phaleria*), 166
caesareus (*Staphylinus*), 165
calmariensis (*Galeruca*), 166
campestris (*Cicendela*), 165
caprea (*Adimonia*), 166
caraboides (*Melandrya*), 166
Carpophilus, 204
castaneus (*Medon*), 142
cephalotes (*Brosicus*), 165
ceramboides (*Cistela*), 106, 107
cervus (*Lucanus*), 299
chlorocephala (*Lebia*), 22
cingulatus (*Megacronus*), 165
circumfusus (*Calomicus*), 166
clavipes (*Donacia*), 261
clypealis (*Hydrovatus*), 140
complanata (*Nebria*), 165
confluens (*Apion*), 299
coryli (*Apoderus*), 166, 191
coryli (*Strophosomus*), 166
crassipes (*Donacia*), 261
Crioceris, 205
curtisi (*Hæmonia*), 261
cylindricum (*Sinodendron*), 165
decorus (*Philonthus*), 106
dentatus (*Cis*), 299
depressa (*Omosita*), 107
duplicata (*Magdalis*), 258
elongata (*Nemosoma*), 107
elongata (*Tillus*), 106, 107
emarginatus (*Atemeles*), 165
emarginatus (*Collyris*), 115
fairmairii (*Oxytelus*), 142
fasciata (*Mordella*), 107
fasciatus (*Brachytarsus*), 107
fascicularis (*Aræocerus*), 37, 84
femorata (*Rhipidocera*), 239
femoratus (*Helæus*), 239
ferrugineus (*Leistus*), 165
formicarius (*Thanasimus*), 190
fuliginosus (*Anchomenus*), 165
fulvibarbis (*Leistus*), 165
funnata (*Typhæa*), 166
fungorum (*Tetratoma*), 107
fuscus (*Colymbetes*), 165
gibbus (*Helopathes*), 166
globosus (*Dyschirius*), 165
göttingensis (*Chrysomela*), 166
grandis (*Anthonomus*), 161
groelandicus (*Colymbetes*), 140
hirtella (*Epicometis*), 140
hololeucus (*Niptus*), 166
hookeri (*Apion*), 299
hyperici (*Chrysomela*), 166
impunctipennis (*Dyschirius*), 165
inquisitor (*Rhagium*), 166
lacordairei (*Triplax*), 190
lavigata (*Heterocercus*), 165
lateralis (*Gillenus*), 165
**Leasia*, 148
linearis (*Atomaria*), 165
linearis (*Dromius*), 165
lineola (*Cryptocephalus*), 165
lineola (*Galeruca*), 166
litura (*Phytodecta*), 166
livens (*Anchomenus*), 106
longicornis (*Quedius*), 141
marginalis (*Dytiscus*), 165
marginatus (*Anchomenus*), 165
marginatus (*Philonthus*), 165
maxillosus (*Crepophilus*), 165
Megalostoma, 148
melanocephalus (*Calathus*), 165
metatarsalis (*Oxyopoda*), 142
miniaturum (*Apion*), 166
mollis (*Opilo*), 107
mortuorum (*Necrophorus*), 299
muralis (*Sitaris*), 22, 258
murino (*Cistela*), 166
nebulosus (*Agabus*), 165
niger (*Tychus*), 165
nigra (*Heterothops*), 141
nigricornis (*Haplocnemus*), 106, 107

- nigriventris (*Dromius*), 165
 noctiluca (*Lampyrus*), 166
 noctilucus (*Pyrophorus*), 140
 obsoletus (*Dichiotrichus*), 165
 obtusum (*Bembidium*), 165
 octomaculata (*Pachyta*), 166
 olivacea (*Phytodecta*), 166
 opticus (*Stenus*), 106
 Osphya, 116
 pallidipenne (*Bembidium*), 165
 pallidus (*Helops*), 166
 paradoxa (*Homalota*), 142
 parallela (*Anthaxia*), 140
 parallelopedus (*Dorcus*), 165
 philanthus (*Hoplia*), 165
 piceum (*Olophrum*), 165
 propinqua (*Medon*), 142
 pubescens (*Dichiotrichus*), 165
 puellus (*Anchomenus*), 92
 quadripunctulatus (*P.*), 22
 quercus (*Trypodendron*), 140
 rubens (*Pyrochroa*), 165
 rufescens (*Bembidium*), 165
 rufipennis (*Lathrobium*), 299
 rufipes (*Melanotus*), 166
 ruficollis (*Silis*), 107
 rugicollis (*Apriona*), 204
 rugulosus (*Ceuthorrhynchus*), 299
 riparius (*Quedius*), 140
 robiniae (*Cyllene*), 160
 rostratus (*Cybeus*), 165
 rotundatus (*Olisthopus*), 92
 russica (*Triplax*), 106
 sabulosum (*Opatrum*), 166
 sabulosus (*Trox*), 107
 sanguineum (*Apion*), 22
 schonherri (*Barynotus*), 22
 sculpturatus (*Oxytelus*), 142
 semivittatum (*Apion*), 258, 259
 serra (*Tiresias*), 107
 serricornis (*Prionocyphon*), 17
 sexpunctatus (*Cryptoccephalus*), 191
 Silpha, 203, 205
 spadicea (*Alcechara*), 111
 spectabilis (*Oxytoda*), 142
 spinibarbis (*Leicistus*), 165
 spiniger (*Hemicopus*), 17
 splendens (*Carabus*), 231
 splendidula (*Cassida*), 166
 stictica (*Oxytharea*), 140
 striatus (*Helops*), 166
 subdepressus (*Cryptophagus*), 259
 succiola (*Alcechara*), 111
 sulcatus (*Otiorrhynchus*), 140
 sulcicollis (*Ceuthorrhynchus*), 184
 sulcirostris (*Cleonus*), 166
 sulphurea (*Cistela*), 166
 terrecola (*Pristonychus*), 165
 thoracia (*Silpha*), 165
 thoreyi (*Anchomenus*), 165
 tigrina (*Hypera*), 259
 Trachyscelis, 116
 typhæus (*Geotrupes*), 165
 variabilis (*Coccinella*), 165
 variolosus (*Oxylæmus*), 140
 verbasci (*Haltica*), 166
 vesicatoria (*Lytta*), 44
 vestitus (*Chlanis*), 165
 vexans (*Quedius*), 141
 viduatus (*Ceuthorrhynchus*), 107, 299
 villosus (*Orechiochilus*), 165
 vulgaris (*Phyllopertha*), 165
 waltoni (*Ctenopsis*), 166
 xanthomelæna (*Tetrastichus*), 38

DIPTERA.

- Agromyza, 231
 albimanus (*Platychirus*), 302
 albobristatus (*Syrphus*), 67
 ampelophila (*Drosophila*), 38
 angulata (*Odontomyia*), 17
 anthropophaga (*Cordylobia*), 167
 arbustorum (*Eristalis*), 67
 bifasciatus (*Syrphus*), 90
 bimacula (*Trichocera*), 205
 bombylans (*Volucella*), 67, 90
 Chrysops, 161
 depressa (*Bengalia*), 167
 destructor (*Mayetiola*), 201
 domestica (*Musca*), 140
 funebris (*Drosophila*), 115
 Glossina, 92
 horticola (*Eristalis*), 90
 illustrata (*Chilosia*), 67
 intermedia (*Neocellia*), 34
 livida (*Empis*), 90
 macellaria (*Compso-myia*), 161
 major (*Bombylius*), 90
 Microdon, 140
 mutabilis (*Microdon*), 167
 nobilitata (*Thereva*), 67
 parva (*Tipula*), 204
 pertinax (*Eristalis*), 90
 pipiens (*Culex*), 160
 poeciloptera (*Platyparea*), 231
 quadrinotatus (*Tabanus*), 206
 ribesii (*Syrphus*), 67, 90
 Sarcophaga, 205
 scripta (*Tepula*), 67
 segnis (*Xylota*), 67
 serrata (*Hæmalobia*), 86, 161
 stabulans (*Cyrtoneura*), 90
 Stomoxys, 92, 141
 Tabanus, 161
 talpæ (*Hystericopsylla*), 140, 142
 westermanni (*Ictericia*), 17

HEMIPTERA.

- aeneus* (*Erycorus*), 239
ancilla (*Carineta*), 291
ancilla (*Herrera*), 291
Angerianus, 3, 60
angulata (*Cicada*), 2
annulata (*Cicadetta*), 58
annulatus (*Tibicen*), 2
Aphæna, 61
Aphanus, 61
atropunctata (*Eupteryx*), 225
aureola (*Dikraneura*), 225
Barma, 3
bifasciata (*Teleonemia*), 60
Borysthene, 3
calcaratus (*Alydus*), 85
calcaratus (*Coriscus*), 85
Cixius, 226
coleoprata (*Issus*), 226
dentatum (*Acanthosoma*), 233
equestris (*Lygæus*), 259
erratica (*Cicada*), 161
ferruginea (*Tetigonia*), 204
finitus (*Cixius*), 3
fodiens (*Schizoneura*), 161
formicetorum (*Piezostethus*), 258
formosa (*Carinata*), 37
fulminia (*Belostoma*), 86
furcata (*Mesovelia*), 298
gothicus (*Lopus*), 239
griseus (*Acanthosoma*), 233
guttigera (*Tetigonia*), 204
hageni (*Cicadetta*), 2
impressopunctata (*Tetigometra*), 226
interstinctum (*Acanthosoma*), 233
interstinctus (*Elasmostethus*), 233
Kirbya, 61
**lantanæ* (*Teleonemia*), 60
Leptocorus, 58
lewisi (*Ænaria*), 203
linnæi (*Ectrichodia*), 85
mactata (*Tomaspsis*), 233
maculatus (*Corixus*), 239
marginella (*Cicada*), 291
marginella (*Herrera*), 291
Metacanthus, 59
Metampsalta, 2
minor (*Elasmostethus*), 232, 233
minutissima (*Plea*), 142
Nabis, 59
Notonecta, 85
Oliarus, 226
Opinus, 61
papillosa (*Tessarotoma*), 115
patelliformis (*Diaspis*), 204
Penthicodes, 61
Penthicus, 61
perniciosus (*Aspidiotus*), 205
phalænoides (*Pæcilopectera*), 43
Polydictya, 59
pulchella (*Aphana*), 59
quadridentata (*Ranatra*), 86
Ranatra, 85
rhomboides (*Vertusia*), 190
sanguinea (*Tomaspsis*), 225
sanguinolenta (*Tomaspsis*), 233
sanguinolenta (*Triecphora*), 232
Seminthocoris, 61
Serinetha, 58
Tapeinus, 61
undata (*Platymetopus*), 226
variegata (*Aphæna*), 59
viridis (*Tetigonia*), 225
viridulus (*Nabis*), 59
vulnerata (*Tomaspsis*), 233
vulnerata (*Triecphora*), 225

HYMENOPTERA.

- abdominalis* (*Macrocentus*), 252, 253
accepta (*Nomada*), 268
Agathis, 218
allicola (*Megachile*), 286
angelica (*Agathis*), 218
annularis (*Acrogaster*), 182
Anthophora, 228
Apanteles, 219
Apis, 228, 229
arcens (*Dorylus*), 68
argentata (*Mutilla*), 50
argentata (*Stenomutilla*), 50
armatella (*Nomada*), 268
armatus (*Acrogaster*), 183
Ascogaster, 180, 182
astragali (*Bombus*), 97
atrocineta (*Anthophora*), 49
aueta (*Mutilla*), 50
aurifusca (*Dioxys*), 267
aurifuscus (*Chrysopheon*), 267
autumnalis (*Epeolus*), 137
**banksi* (*Nomada*), 98
**banksi* (*Triepeolus*), 135
**barberiellus* (*Epeolus*), 266
bardus (*Halictus*), 266
Bassus, 239
**bhotanensis* (*Ipbiaulax*), 4
bifasciata (*Mutilla*), 50
blanditum **prædentatum* (*Anthidium*)
 99
Bombus, 228
**borneana* (*Tiphia*), 268, 269
borneoensis (*Euagathis*), 230
brevicaudis (*Microdus*), 218
brevisetis (*Agathis*), 218
calculator (*Microdus*), 281
cameronella (*Mutilla*), 50
Camponotus, 260

- canifrons (Acrogaster), 183
 capitosus (Chelonus), 181
 carbonum (Osmia), 228, 229
 *carnicollis (Zethus), 80
 caudatus (Sigalphus), 184
 *ceanothii (Nomada), 97
 Ceratocolus, 51
 Chelonus, 180
 chicotencati (Zethus), 63
 chlorophthalmus (ZeZe), 253
 Chrysis, 234
 *claripennis (Zethus), 63
 clausthalmus (Microdus), 218, 219
 *cingulata (Cratojoppa), 6
 cingulatus (Strongylogaster), 69
 cingulipes (Microdus), 218
 collearis (Macrocentrus), 252, 253
 *confluenta (Megachile), 286
 confusa (Melissodes), 268
 confusa (Mutilla), 50
 cornuta (Megachile), 50
 corvulus (Chelonus), 181
 crucis (Epeolus), 266
 crucis (Nomada), 265
 *Cyanotiphia, 287
 cymbalaria (Nomada), 268
 dedjax (Salinus), 260
 dentata (Phanerotoma), 179
 *dentipes (Microjoppa), 269
 Didymogastra, 62, 63
 Dinetus, 51
 discolor (ZeZe), 253
 dispar (Chelonus), 182
 dives schenckii (Crabro), 51
 donatus (Triepeolus), 135
 dormitans (Aphis), 228
 druryi (Comptosomeris), 50
 ducis (Andrena), 50
 *dudgeoni (Acanthojoppa), 7
 *dudgeonii (Allantus), 3
 Earinus, 218, 219
 Echthrus, 6
 edwardsii (Bombus), 97
 effossa (Anthophora), 228
 electa (Nomada), 98
 electella (Nomada), 98
 erythrogaster (Zethus), 79
 Eucera, 50
 Eumenes, 83
 excavatus (Crabro), 51
 fasciata (Andrena), 50
 fasciata (Mutilla), 50
 fervida (Nomia), 285
 flava (Formica), 141
 flavipennis (Tiphia), 289
 florea (Apis), 228
 floricola (Sigalphus), 184
 florilega (Nomada), 97
 florissantella (Perdita), 267
 *fortistriolatus (Zethus), 82
 *fremontii (Melissodes), 268
 fuliginosus (Lasius), 167
 *fulvo-hirtus (Zethus), 63
 fumipennis (Tiphia), 289
 fusca (Formica), 140, 167
 galenus (Ichneumon), 277
 *garciana (Nomada), 265
 gaudryi (Anthophorites), 228
 geniculata (Microjoppa), 269
 gigas (Sirex), 239
 gloriatorius (Earinus), 219
 Gonatopus, 167
 Gorytes, 234
 gracilis (Nomada), 98
 guttata (Sphex), 51
 *henshawii (Apis), 229
 henshawii (Synapsis), 229
 illinoensis (Nomada), 97
 illinoensis (Panurginus), 138
 illinoensis (Nomada), 268
 inanimatus (Chelonus), 181
 *infantula (Nomada), 98
 infirmus (Macrocentrus), 252, 253
 instabilis (Acrogaster), 182
 irrorata (Sphaeropteryx), 179
 letus (Scaphron), 210
 levinodus (Z.), 82
 *lamellicollis (Zethus), 62
 laminatorius (Proctichneumon), 240
 latrunculus (Chelonus), 182
 lectoides (Epeolus), 136
 lectus (Epeolus), 136
 *lepidii (Perdita), 266
 lepidus (Alloderus), 183
 leporina (Cilissa), 67
 *leptopterus (Euagathis), 229
 leptopterus (Iphiaulax), 230
 linguarius (Microdus), 218, 219
 lippii *sublippii (Nomada), 265
 longitarsis (Panisens), 8
 luteipes (Sigalphus), 184
 Macrocentrus, 251
 Macrocera, 50
 maculata (Cratojoppa), 7
 maculata (Vespa), 50
 malvacearum (Agathis), 218
 manicatum (Anthidium), 260
 marginator (Macrocentrus), 252
 *martii (Dioxys), 267
 *mathewi (Ichneumon), 277
 mediator (Microdus), 218
 meliloti (Halictus), 266
 meliloti (Spinollicella), 266
 Melipona, 228, 229
 mellifera (Apis), 228, 229
 mellona (Anthophorites), 229
 mendozana (Megachile), 50
 mesillensis (Halictus), 266
 Metazethoides, 62
 Microdus, 218
 micropterus (Orgilus), 219
 modesta (Nomada), 265
 moera (Megachile), 286
 montana (Habropoda), 49
 montivagus (Anthidium), 99
 mussitans (Apis), 49
 mussitans (Eulema), 49
 mussitans nigrifacies (Eulema), 49

- myrmecophila (Kleditoma), 167
 mysops (Melissodes), 269
 Nematus, 204
 neomexicana (Nomada), 265
 nigra (Agathis), 218
 nigra (Mutilla), 50
 nigricans (Dorylus), 68
 nitidinodeus (Zethus), 81
 nitidulus (Earinus), 219
 nugax (Microdus), 218, 219
 *nursei (Nomia), 284
 *nursei (Colletes), 285
 obscurata (Perdita), 267
 obscurator (Orgilus), 219, 220
 obscurellus (Sigalphus), 184
 Orgilus, 218
 Osmia, 228, 234
 Paratiphia, 288
 parva (Nomada), 99
 parvum (Dianthidium), 100
 pauper (Panurginus), 137, 138
 pectoraloides (Haliectus), 266
 pheres (Iphiaulax), 230
 phryne (Tetralonia), 50
 pictus (Crabro), 51
 pictus (Dinetus), 51
 pilipes (Anthophora), 22, 90, 258
 placida (Nomada), 98
 Plesiozethus, 62
 Pompilus, 234
 postera (Anthidium), 99
 potentillæ (Xestophanes), 46, 118
 pretiosa (Chetostricha), 215
 pretiosa (Trichogramma), 201, 205
 producta (Dioxys), 267
 pudicum (Dianthidium), 99
 *punctinodeus (Zethus), 79
 pusillus (Epeolus), 137
 quadridentatus (Acrogaster), 183
 quadrimaculata (Scolia), 50
 radoszkowskii (Andrena), 50
 radoszkowskii (Podalirius), 49
 ribesii (Nematus), 205
 ribesii (Pleronus), 205
 robusta (Cratojoppa), 7
 rondanii (Mutilla), 50
 rufa (Formica), 165, 258
 *ruficauda (Cyanotipha), 288
 rufidens (Acrogaster), 183
 rufipalpis (Agathis), 218
 rufipes (Acrogaster), 182
 rufipes (Crabro), 51
 rufipes (Microdon), 218, 219
 rufipes (Pezomachus), 219
 rufipes (Solenius), 51
 rufiventris (Dioxys), 267
 rufocinctus (Bombus), 97
 rufo-ornatus (Buodias), 8
 rugulosus (Microdus), 218
 rupestris (Psithyrus), 90
 saharæ (Mutilla), 50
 sanguinea (Formica), 258
 *satapensis (Cremonops), 230
 sayi (Nomada), 97
 secutor (Chelonus), 182
 *semilectus (Epeolus), 136
 sericea (Abia), 90
 Sigalphus, 183
 snowi (Nomada), 265
 Solenius, 51
 speculator (Chelonus), 181
 *spilaspis (Dasyproctus), 283
 stigma (Tiphia), 289
 strigosus (Z.), 83
 *subaccepta (Nomada), 267
 sulcatus (Chelonus), 182
 surinamensis (Eulema), 49
 sylvarum (Bombus), 90
 Tachysphex, 234
 testaceator (Zelee), 253
 texana (Nomada), 265
 thoracicus (Macrocentrus), 252
 tortifolia (Perdita), 267
 transcaspica (Andrena), 50
 tuberculata (Cerceris), 51
 *tuberculatus (Hydrocryptus), 5
 tubulifer (Zethus), 63
 tumidulus (Microdus), 218, 219
 variipes (Acrogaster), 183
 *veronæ (Epeolus), 136
 vicinalis (Nomada), 268
 *virginicus (Panurginus), 137
 *virginiensis (Epeolus), 137
 wallacei (Mutilla), 50
 wyomingensis (Triepeolus), 136
 Zelee, 251
 Zethoides, 62
 Zethusculus, 82
 zonator (Earinus), 219

LEPIDOPTERA.

- abietaria (Boarmia), 16, 22, 44, 116, 191
 abietaria (Eupithecia), 170
 abietaria (Phaëna), 170
 abjecta (Hama), 10
 abjecta (Mamestra), 10, 19
 abruptaria (Hemerophila), 20, 21, 44, 45,
 261, 301
 abruptaria (Synopsis), 216
 absinthiata (Eupithecia), 171
 accaciaria (Boarmia), 104
 accentifera (Nephele), 104
 aceris (Neptis), 303
 achatinella (Nyctegretes), 296
 achine (Pararge), 76, 198, 242
 achine (Teracolus), 114
 actæa (Satyrus), 78
 adæquata (Larentia), 302
 æthiops (Erebia), 112

- adippe (Argynnis), 76, 77, 112, 186, 196,
 215, 224, 225, 247
 adrasta (Pararge), 116
 adusta (Eumichtis), 71, 72
 adusta (Hadena), 19, 41, 57, 153
 advenaria (Epione), 16, 298
 agdion (Z.), 247
 agon (Lycæna), 17, 20, 21, 44, 102, 111,
 114, 157, 239
 agon (Plebius), 261
 asculi (Thecla), 196, 225
 ascularia (Anisopteryx), 110
 ethiops (Miana), 105, 111
 affinis (Cosmia), 93
 *affinis (Neurosymploca), 123
 affinitata (Emmelesia), 41, 156
 aganippe (Delias), 239
 agathina (Agrotis), 45, 254
 agathina (Mylothris), 259, 298
 agestis (Aricia), 20, 300
 agestis (Lycæna), 20, 44, 302
 aglaia (Argynnis), 40, 67, 112, 118, 156,
 189, 247
 albicilata (Melanthia), 191
 albicosta (Coleophora), 240
 albifasciaria (Zamarca), 204
 albipuncta (Leucania), 10
 albipunctata (Eupithecia), 123, 221
 albomarginata (Abraxas), 295
 albulata (Emmelesia), 57, 68, 129
 alceella (Chrosis), 157
 alchemillata (Emmelesia), 156
 alchymista (Catephia), 20
 alciphron (Chrysophanus), 197, 259
 alcon (Lycæna), 76, 244, 247
 alecto (Erebia), 259
 alexanor (Papilio), 78, 152, 224, 225
 alexis (Lycæna), 40, 44, 114, 240, 300
 algira (Ophiura), 104
 Allotinus, 69
 alni (Acronycta), 19
 alniaria (Ennomos), 301
 alpina (Agrotis), 10
 alpina (Aricia), 200
 alpina (Lycæna), 44
 alpina (Pachnobia), 57
 alpinalis (Scopula), 57
 alpinata (Psodos), 116
 alsines (Caradrina), 67, 111, 238
 alsus (Lycæna), 90
 alternana (Conchylis), 91
 alternaria (Eupithecia), 172
 althææ (Characharodus), 150, 153
 alveola (Cryptolechia), 239
 alveus (Hesperia), 152, 153, 198, 246
 amaryllis (Heliconius), 90
 Amathes, 70
 ambigua (Caradrina), 192
 ambigualis (Scoparia), 68
 *amœna (Arniocera), 126
 amyntas (Lycæna), 199, 200
 anargyra (Argynnis), 103
 anceps (Mamestra), 191
 andreniformis (Ægeria), 17, 18
 andreniformis (Sesia), 17, 189, 213, 259
 andromede (H.), 214
 anglicata (Eupithecia), 173
 angulum (Plusia), 101
 angustana (Eupæcilia), 157
 angustiorana (Capua), 211
 anomala (Stilbia), 57, 151, 158
 antiopa (Euancassa), 153, 162
 antiopa (Vanessa), 214
 Antitype, 70
 apiformis (Trochilium), 19
 apollo (Parnassius), 196, 224, 242, 245
 248
 aprilina (Agriopis), 72, 89
 aprilina (Diphthera), 72
 arcana (Cœnonympha), 197, 198, 245
 arcas (Lycæna), 242
 arcuata (Maurilia), 101
 arcuosa (Miana), 156
 areola (Xylocampa), 71
 arethusa (Hipparchia), 76, 78
 arethusa (Satyrus), 214, 258
 argentea (Argyroglea), 70
 argentella (Elachista), 90
 argentifera (Nephele), 292
 argentula (Banksia), 105, 260
 argentula (Eratraria), 261
 argia (Leuceronia), 149
 argiades (Erias), 151, 153
 argiades (Everses), 195, 225
 argiades (Lycæna), 199, 236
 argillacea (Leucania), 93
 argiolus (Celastrina), 261
 argiolus (Cyaniris), 138, 153, 225
 argiolus (Lycæna), 111
 argus (Lycæna), 17, 239
 argus (Plebius), 261
 argus (Rusticus), 224
 argyrognomon (Rusticus), 78, 196, 213,
 246
 arion (Lycæna), 46, 68, 76, 118, 120, 156,
 196, 223, 224, 244, 262, 303
 aristæus (Hipparchia), 77
 aristæus (Satyrus), 103
 armigera (Heliopsis), 12, 19, 263
 artaxerxes (Lycæna), 161
 artemis (Melitea), 300
 artemisia (Argyrites), 71
 artemisia (Cucullia), 71
 arundinis (Macrogaster), 106
 arundinis (Nonagria), 301
 ashworthii (Agrotis), 21, 22, 90, 299, 301
 asiliformis (Sesia), 252
 assimilata (Eupithecia), 20, 171
 assimilis (Crymodes), 57
 assimilis (Saliunca), 122, 123
 associata (Cidaria), 68
 astasioides (Apatura), 243
 asterias (Papilio), 17
 asteris (Cucullia), 112, 113, 157, 260
 asteris (Eudæra), 71
 astrarche (Lycæna), 46, 90, 112, 161
 astreas (Rhodogastria), 104
 atalanta (Pyrameis), 189

- atalanta (Vanessa), 89, 110, 129, 140,
 154, 162
 athalia (Melitæa), 42, 193, 198, 224,
 225
 atomaria (Ematurga), 20, 40, 117
 atomaria (Fidonia), 153, 258
 atra (Oreopsyche), 214
 atraria (Eupithecia), 209
 atrata (Odezia), 114
 atrata (Tanagra), 68, 155
 atrilineata (Hemerophila), 204
 atriplago (Thermesia), 104
 atropos (Acherontia), 14, 134
 augur (Noctua), 89
 aurago (Cosmia), 72
 aurago (Ochria), 72
 aurana (Trycheris), 68
 auriaria (Hybernia), 129
 aureatella (Micropteryx), 128
 auricoma (Acronycta), 191
 aurifera (Plusia), 92
 auriflua (Porthesia), 204
 aurinia (Melitæa), 151, 153, 196, 198,
 215, 247
 auroraria (Hyria), 239
 ausonia (Anthocharis), 196
 australis (Aporophyla), 20, 21, 71
 autanossa (Zizera), 236
 autumnaria (Ennomos), 239, 256, 299,
 300
 autumnaria (Eugonia), 260
 autumnata (Larentia), 255
 autumnata (Oporabia), 191, 289
 avellanella (Semiocopus), 55
 aversata (Acidalia), 129, 261
 badiata (Anticlea), 260
 baja (Noctua), 41, 67
 bajularia (Euchloris), 261
 balliensis (Ixias), 18
 ballus (Thestor), 214
 bandana (Eupithecia), 171
 barrettii (Dianthœcia), 10
 *basalis (Netrocera), 126
 basilinea (Apamea), 43, 67
 batis (Thyatira), 44
 baton (Lycæna), 214
 baton (Polyommatus), 151, 152, 196
 battus (Lycæna), 214
 baumanniana (Hypsa), 25, 107
 bejarensis (Lycæna), 17
 belemia (Anthocharis), 91
 belemia (Euchloc), 303
 belia (Anthocharis), 150, 151, 152,
 196
 bella (Zephyrus), 212
 bellargus (Agriades), 191, 215
 bellargus (Lycæna), 44, 189, 224, 225,
 259, 262, 301
 bellargus (Polyommatus), 78, 151, 153,
 196, 223, 300
 bellidice (Pieris), 91
 bellidice (Pontia), 150, 151, 152
 bellizina (Anthocharis), 91, 101, 151
 153, 196
 bennetii (Adactylus), 143
 berisalensis (Melitæa), 195
 betula (Ruralis), 256
 betula (Thecla), 78, 105
 betula (Zephyrus), 256
 betularia (Amphidasys), 23, 89, 105, 189,
 191
 betularia (Pachys), 93
 bicuspis (Cerura), 10
 bicuspis (Dicranura), 40, 91, 117, 215,
 239
 bicolorana (Miana), 238
 bicoloria (Leucodonta), 295
 bidentata (Odontopera), 24, 44, 142,
 301
 bifasciana (Sericoris), 183
 bifida (Dicranura), 111, 239
 bilineata (Camptogramma), 41, 68, 93,
 141, 155
 bilinea (Grammesia), 105
 bimaculosa (Meganophra), 72
 binaria (Drepana), 89
 Binsitta, 117
 bipunctidactyla (Adkinia), 144
 bipunctidactylus (Mimaseoptilus), 156
 biselliella (Tineola), 261
 bistriga (Crytoblades), 106
 biundularia (Tephrosia), 19, 110
 blanda (Caradrina), 111
 blandiata (Larentia), 302
 blandiata (Emmelesia), 57
 blandina (Erebia), 112, 113, 117, 154,
 157
 Blepharidia, 71
 blomeri (Asthenia), 21
 boetica (Lycæna), 134
 boisduvali (Crenis), 104
 bolina (H.), 186
 Bombycia, 71
 borealis (Aretia), 44
 botonga (Rhodochlœna), 70
 brachydactylus (Pterophorus), 20
 bractea (Plusia), 11, 41, 57, 116, 295
 brassica (Mamestra), 155, 238
 brassica (Pieris), 19, 40, 42, 43, 150,
 152, 154, 189, 214
 brazilensis (Megalca), 70
 brevillea (Nonagra), 106
 Brinsitta, 69
 briseis (Hipparchia), 76
 briseis (Satyrus), 214, 258
 brumata (Cheimatobia), 300
 brunnea (Noctua), 57, 301
 Bryomima, 70
 bryonia (Pieris), 68, 107, 246, 259
 Bryophila, 302
 bucephala (Pygæra), 217, 257, 260
 buolana (Ictinia), 157
 c-album (Grapta), 198
 c-album (Polygonia), 117, 140, 142
 c-album (Vanessa), 297
 cærulea (Lycæna), 301
 cæruleata (Eupithecia), 171
 cæsia (Dianthœcia), 19

- casiata* (Larentia), 40, 43, 57, 67, 68, 153, 154, 158
casiella (Swammerdamia), 300
caspitis (Luperina), 158
castra (Neurosynoplaea), 123
cagnagellus (Hyponomeuta), 299
caia (Aretia), 92, 117, 118, 139, 166, 214, 239, 295, 301
caja (Chelonia), 253
calisto (Apina), 239
Callibaptes, 126
callidice (Pontia), 244
Callidryas, 134
callune (Bombyx), 132, 300
callunæ (Eupithecia), 171
callunæ (Lasiocampa), 132
calypso (Belonius), 17
cambricaria (Venusia), 153
camelina (Notodonta), 141
camilla (Limnitis), 196
campanulata (Eupithecia), 171, 208, 210
caua (Catoptina), 68
candelarum (Agrotis), 22
camna (Ectochela), 70
caniola (Lithosia), 40, 43, 215, 260
cannæ (Nonagria), 44, 93, 259, 300
capax (Xylotype), 70
capensis (Chærocampa), 104
capensis (Duomitas), 104
capsicola (Dianthecia), 41, 67
capucina (Miselia), 89
carbonaria (Fidonia), 57
cardamines (Anthocharis), 91
cardamines (Euchloë), 16, 20, 42, 90, 150, 151, 156, 189, 224, 244, 261
cardui (Cynthia), 46
cardui (Pyrameis), 13, 40, 134, 153, 189, 214, 292
cardui (Vanessa), 129, 138, 162
carphodactylus (Leioptilus), 91, 117, 167
carpinata (Ennomos), 215
carpinata (Lobophora), 56
carpini (Saturnia), 191, 239
carpophaga (Dianthecia), 91
cassiope (Erebica), 154, 244
casta (Aretia), 225
casta (Mesoleuca), 117
castanea (Noctua), 142, 301
castanea (Phragmatocia), 261
castigata (Eupithecia), 209, 210
castrensis (Malacosoma), 10, 44, 300
**catori* (Homophylotis), 125
cauchyata (Eupithecia), 172
cauchiata (Eupithecia), 172
**caudata* (Byblisia), 127
celerio (Chærocampa), 10, 12, 104, 120, 189, 214, 263
cenea (Papilio), 187
centralista (Eupithecia), 300
ceronus (Lycæna), 259
cerago (Citria), 72
cerago (Cosmia), 72
cerago (Xanthia), 72, 89
ceratonix (Myeloidis), 8
ceronus (Polyommatus), 196
cervina (Protophæna), 70
cervinata (Ortholitha), 118
ceto (Erebica), 244
chalcites (Plusia), 104, 120, 205
chalcobares (Abraxas), 295
**Chalconyces*, 123
chalcocæna (Abraxas), 295
chaonia (Drymonia), 257
chaonia (Notodonta), 42, 257
Charidea, 109
charlonia (Anthocharis), 91
chenopodii (Hadenæ), 142
chenopodiella (Scythris), 192
chi (Antitype), 72
chi (Polia), 41, 44, 113, 153, 191
chlors (Mylothris), 259
Chloroclystus, 170
chlorodice (Pieris), 91
christi (Erebica), 245, 246
christyi (Oporabia), 191
chrysidiformis (Sesia), 44
chrysippus (Danais), 134, 187
chrysippus (Limnas), 114
chrysitis (Plusia), 41, 44, 68, 89, 104, 111
chrysographella (Jathesia), 204
chryson (Plusia), 11
chrysorrhæa (Euproctis), 48, 86
chrysorrhæa (Orthesia), 48, 164, 186, 211
ciliialis (Pyrausta), 261
cineræ (Eupithecia), 172
cinnides (Lycæna), 259
cinxia (Meliæa), 20, 150, 152, 191, 196, 215
circe (Satyrus), 214, 258
circellaris (Amathes), 72
circellaris (Busina), 72
citrato (Cirrhia), 72
citrana (Aspilates), 192
clara (Lycæna), 300
clathrata (Strenia), 68, 153, 295
clathrata (Tinea), 239
cleodoxa (Argyrenis), 76, 77
cleopatra (Gonepteryx), 150, 152, 212, 214
cleocella (Tinea), 190
elytic (Apatura), 76, 198
cnicæna (Argyrolepis), 157
c-nigrum (Agrotis), 214
c-nigrum (Noctua), 67, 238
codeti (Ammetopa), 70
conosa (Lælia), 140, 295
cognatellus (Hyponomeuta), 213
columbina (Heliconius), 90
combusta (Xylophasia), 153
comes (Triphæna), 41, 45, 158, 238
comitata (Pelurga), 89
comma (Augiades), 42, 105
comma (Hesperia), 90
comma (Leucania), 41
comma (P.), 105
comma-notata (Cidaria), 113
communana (Sciaphila), 46
complanula (Lithosia), 43

- Comptosata, 109
 concolor (Tapinostola), 10, 301
 concomitella (Lithocolletis), 141
 conflua (Noctua), 41
 conformis (Xylina), 11, 297
 conigera (Leucania), 41, 66, 67, 155
 Conistra, 70
 conjugella (Argyresthia), 231, 234
 consignata (Eupithecia), 167, 170
 consociella (Rhodophaea), 253
 consortaria (Boarmia), 44
 conspersa (Dianthæcia), 190
 conspicua (Hypsa), 25, 107
 conspicularis (Xylomiges), 11
 contigua (Hadena), 57
 constrictata (Eupithecia), 156, 171
 conversaria (Boarmia), 45, 215
 convolvuli (Sphinx), 66, 104, 189, 237
 cordigera (Anarta), 56, 57, 191, 301
 cordula (Satyrus), 78, 246
 coretas (Lycæna), 200
 coronata (Chloroclystis), 170, 222
 coronula (Acronycta), 105
 corsica (Lycæna), 102
 corticea (Agrotis), 41, 296
 corunna (Spiramiopsis), 104
 corva (Huphna), 18
 corydon (Agiades), 20, 42, 215, 261
 corydon (Lycæna), 20, 22, 42, 44, 46, 90, 224, 301
 corydon (Polyommatus), 196, 300
 corylara (Angerona), 15
 corylata (Cidaria), 41, 57
 coryli (Demas), 13
 Cosmia, 70
 costovata (Melanippe), 191
 cracca (Toxocampa), 239, 300
 crategi (Aporia), 14, 44, 167, 168, 191, 198, 214, 247
 crategella (Scoparia), 68
 crepuscularia (Pephrusia), 89, 90, 128
 cretaceæ (Ophalmodes), 204
 cribrella (Myelois), 70, 213
 cribrum (Myelophila), 213, 237
 cristana (Peronea), 91, 117
 croceago (Jodia), 71
 croceago (Hoporina), 71
 croceago (Lampetia), 71
 croceago (Oporina), 43, 167
 croceago (Xantholeuca), 71
 cruciferarum (Plutella), 89
 cruda (Tæniocampa), 44, 90
 cubicularis (Caradrina), 14, 89
 cucubali (Dianthæcia), 19, 67
 cucullatella (Nola), 215
 Cucullia, 70
 culiciformis (Sesia), 11, 252, 294
 culmellus (Crambus), 68
 cultraria (Drepana), 22
 cunea (Hyphantria), 161
 cuprella (Adela), 192
 curtisii (Triphæna), 45
 curta (Pygera), 302
 cyllarus (Nomiades), 151, 153, 196, 198
 cympiformis (Sesia), 252
 cyntia (Melitæa), 247
 damone (Anthocharis), 91
 damon (Polyommatus), 248
 daphne (Brenthis), 224
 daphnice (Pieris), 78, 91
 daplidice (Pontia), 150, 151, 214, 224
 davus (Cœnonympha), 20, 66, 111
 dealbana (Hedya), 89
 deaurana (Lozopera), 183
 decolorata (Emmelesia), 68
 defoliaria (Hybernia), 46, 69, 90, 129
 deione (Melitæa), 78, 195
 delagorguei (Ludia), 103
 Delas, 70
 delius (Parnassius), 245, 261
 demoleus (Papilio), 42, 104, 133
 denotata (Eupithecia), 171, 208, 209
 dentana (Hadena), 66, 67
 deplana (Lithosia), 16
 depuncta (Noctua), 58
 derasa (Habrosyne), 261
 derivata (Anticlea), 41, 301
 dermaptera (Myrina), 104
 deschangei (Spilosoma), 295
 dia (Brenthis), 151, 153, 198, 224
 dictæa (Notodonta), 111
 dictæoides (Notodonta), 111
 dictæoides (Pheosa), 22
 dictynna (Melitæa), 198, 242, 244
 didyma (Apamea), 41, 67
 didyma (Melitæa), 78, 196, 214, 225, 244, 246
 didymata (Larentia), 40, 68, 153, 158
 digitalis (Brachycozmia), 71
 diffinis (Gelechia), 89
 *diffinis (Netrocera), 126
 *difformis (Salunca), 122
 dilutata (Oporabia), 19, 40, 191, 290, 300
 dimidiata (Acidalia), 68, 238
 diplostigma (Elvesia), 70
 dipsacea (Heliothis), 257
 discordella (Colocophora), 190
 dispar (Chrysophanus), 9, 145, 175, 259
 dispar (Lymantria), 10
 dispar (Porthesia), 86
 disparata (Eupithecia), 173
 distinctaria (Eupithecia), 170, 171
 dodonæa (Eupithecia), 172, 240
 dominula (Callimorpha), 240, 294
 dorilis (Chrysophanus), 78, 153, 196, 197
 dorilis (Loweia), 224, 225
 dorippus (Danais), 42
 dorus (Cœnonympha), 18
 doubledayaria (Amphidasys), 23, 89, 105, 189
 doubledayaria (Pachys), 93
 dromedarius (Notodonta), 10, 22, 41
 dryas (Enodia), 76
 dubitalis (Scoparia), 19, 68, 89, 90, 156
 dumetaria (Pandemis), 192

- duplaris (Cymatophora), 44, 57, 141
 duponchelii (Leucophasia), 78, 151, 153,
 195, 223, 225
 *durbanica (Malambria), 125
 echo (Ophiura), 104
 edusa (Colias), 14, 150, 152, 196, 214,
 257, 292
 egea (Grapta), 225
 egea (Polygonia), 196
 egeria (Pararge), 20, 153, 189, 224, 248,
 261, 303
 egerides (Pararge), 248
 egialca (Amauris), 114
 elinguaris (Crocallis), 68
 eliza (Argynnis), 102
 elpenor (Chærocampa), 240
 elutata (Hypsipetes), 112, 301
 elutata (Ypsipetes), 19
 elymi (Tapinostola), 106
 Empusada, 70
 empyrea (Rhizotype), 72
 enutaria (Acidalia), 19
 eos (Melitæa), 193
 epiphron (Erebia), 130, 153, 154
 Epirrhoe, 119
 epistygne (Erebia), 151, 153, 224, 303
 equestraria (Ennomos), 215
 ergane (Pieris), 261
 ericetata (Emmelesia), 57
 ericetaria (Schdsema), 157
 erminea (Phalena), 278
 erschoffi (Arctia), 262
 erythrocephala (Comistra), 72
 erythrocephala (Orrhodia), 10
 escheri (Polyommatus), 224, 241, 243
 eson (Chærocampa), 104
 Eucymatoge, 169
 eumedon (Lycæna), 239
 eumedon (Polyommatus), 217
 eupheno (Anthocharis), 91
 euphenoides (Anthocharis), 91
 euphenoides (Euchloe), 150, 152, 196,
 214, 225
 euphorbiæ (Deilephila), 9, 212, 214, 259
 euphorbiæ (Hylas), 299
 euphrosyne (Argynnis), 11, 40, 118, 128,
 298
 euphrosyne (Brenthis), 151, 153, 196,
 224, 244
 Euphyia, 119
 Eupithecia, 112, 169, 302
 eurybia (Chrysophanus), 246
 evias (Erebia), 152, 153, 196, 224, 303
 exclamationis (Agrotis), 66, 67, 155,
 190, 238
 exigua (Caradrina), 42, 120, 295
 exigua (Laphygma), 12, 14, 20, 21, 42,
 93
 exigua (Sphodoptera), 120, 205
 exigua (Eupithecia), 89
 exoleta (Calocampa), 56, 71, 190, 215
 exoleta (Axylia), 71
 exoleta (Xylina), 71
 expallidata (Eupithecia), 171
 extimalis (Evergestis), 257
 extranca (Leucania), 13, 237
 extrema (Tapinostola), 301
 exulans (Anthrocoera), 19
 exulus (Crymodes), 10, 57
 fagella (Cheimabache), 142
 fagi (Stauropus), 10, 42, 44, 190, 240,
 257, 262
 falcatoria (Drepana), 57
 falcatoria (Platypteryx), 41
 falloni (Anthocharis), 91
 farinalis (Cedestis), 215
 fasciaria (Ellopie), 20
 fasciata (Arctia), 195, 225, 260
 fasciata (Euproctis), 114
 fasciuncula (Miana), 67
 fausta (Anthrocoera), 78
 favicolor (Leucania), 10, 193, 295
 ferreata (Eupithecia), 209
 ferrogrisea (Calfristus), 70
 ferrugata (Coremia), 111
 ferrugata (Xanthorhoe), 18, 115
 ferruginea (Xanthia), 89
 festiva (Noctua), 57, 67, 153
 festuæ (Plusia), 11, 22
 fibrosa (Helotropha), 118
 ficklini (Dianthæcia), 190, 300
 fidia (Satyrus), 78
 filigrammaria (Oporabia), 153
 filipendulæ (Anthrocoera), 19, 239, 300
 filipendulæ (Zygæna), 10, 67
 fimbria (Triphæna), 42
 flammea (Meliana), 90, 93, 261
 flammea (Rhizotype), 72
 flammeana (Euchromia), 182
 flava (Diacrisia), 104
 flavago (Cosmia), 72
 flavalis (Pyrausta), 46
 flavella (Depressaria), 68
 flavescens (Pieris), 91
 flavicincta (Antitype), 72
 flavicincta (Polia), 89, 129, 191
 flavicinctata (Larentia), 154
 flavicornis (Asphalia), 55, 56
 flavidorsana (Dichrorampha), 19
 flavinata (Cupaxa), 103
 flavofasciata (Abraxas), 261
 florella (Catopsilia), 134
 fluctuata (Melanippe), 155, 191
 fontis (Doinolocha), 129
 forficælis (Pionea), 68
 forficellus (Schonobius), 111
 forskaleana (Tortrix), 113
 fortis (Homoneconemis), 70
 francillonana (Lozopera), 183
 francaonia (Malacosoma), 44
 fraxinata (Eupithecia), 172, 206, 207, 208
 fraxini (Catocala), 11
 frobenia (Neptis), 134
 fulgens (Nepticula), 257
 fuliginaria (Boletobia), 116
 fuliginosa (Arctia), 44
 fuliginosa (Phragmatobia), 40
 fulva (Tapinostola), 112, 158

- fulvago (Citria), 72
 fulvago (Cosmia), 72, 118
 fulvaticata (Abraxas), 295
 fulvata (Cidaria), 41
 fulvata (Melanargia), 68
 fulvinotata (Phlegethontius), 104
 fumata (Acidalia), 153
 fumosa (Eupithecia), 171
 furcifera (Graptolitha), 71
 furcifera (Xylina), 297
 fureula (Cerura), 23
 furva (Mamestra), 57, 66, 67, 153
 fuscantaria (Ennomos), 112, 299
 fuscata (Erannis), 216
 gaika (Zizera), 133, 134
 galatea (Melanargia), 68, 156, 197, 224,
 225, 239, 243
 galathea (Melanargia), 299
 galli (Deilephila), 9, 301
 gamma (Plusia), 41, 44, 68
 gemina (Apamea), 153, 156
 geminipuncta (Nonargia), 44, 93, 116
 gemmaria (Boarmia), 301
 geniste (Hadena), 89
 gerungana (Amphusa), 157
 Gerydus, 69
 gilvago (Cosmia), 72, 112
 gilvago (Xanthia), 129
 glacialis (Erebia), 245, 246
 glaphyra (Arctia), 262
 glareosa (Noctua), 22, 41, 46, 301
 glauca (Hadena), 57
 glaucinaria (Gnophos), 116
 Glaucopsis, 109
 glyphica (Euclidia), 298
 glennia (Saliunca), 123
 Gnoscelis, 170
 gnaphalii (Cucullia), 11, 215, 295
 gnaphalii (Eucalimia), 71
 goante (Erebia), 78, 303
 gondoti (Euplexa), 185
 gonostigma (Orgyia), 118
 goodwini (Astheua), 33
 goossensata (Eupithecia), 171
 gordius (Chrysophanus), 149, 197, 225
 gorge (Erebia), 245, 247, 303
 gothica (Tæniocampa), 56, 90, 142, 215,
 297
 gothicina (Tæniocampa), 215
 graminis (Chæræas), 41, 67, 153
 granitella (Acrolepia), 183
 graphodactylus (Stenoptilia), 8, 295
 Graptolitha, 70
 grayi (Polyptychus), 104
 griseo-capitella (Swammerdamia), 300
 griseola (Lithosia), 43
 griseovariegata (Panolis), 142
 grossulariata (Abraxas), 11, 68, 13, 234,
 240, 261, 294, 295, 300, 301
 gruneri (Anthocharis), 91
 gumpiana (Peronea), 117
 haggerti (Tæniocampa), 44
 hardwickii (Parnassius), 245
 hastata (Melanippe), 16, 298
 hastata (Rheumaptera), 119
 haworthii (Celæna), 153
 haworthiata (Eupithecia), 172, 221
 hazeleimensis (Abraxas), 295
 hebe (Arctia), 214, 225
 hector (Papilio), 185
 heetus (Hepialus), 111
 Heliconius, 114
 Heliphobus, 71
 helvola (Amathes), 72
 helvola (Anchocelis), 41
 hepatica (Xylophasia), 111
 herbida (Aplecta), 57
 hero (Cænonympha), 76
 hilaris (Harpagophana), 70
 hippothoe (Chrysophanus), 76, 198, 298
 hirtaria (Biston), 128
 hispida (Leucochlæna), 71
 holmiana (Dictyopteryx), 68
 Homohadena, 70
 houratii (Thais), 224
 hortuellus (Crambus), 90, 112
 hospita (Chelonia), 154
 hospita (Nemeophila), 57, 154
 hospiton (Papilio), 77, 101
 humuli (Hepialus), 40, 67, 89, 154
 Huphina, 116
 hutchinsoni (Vanessa), 297
 hyale (Colias), 13, 150, 152, 196, 224
 hyalinalis (Botys), 22
 hyalinalis (Pyrausta), 22
 hybridella (Eupœcilia), 157
 hydara (Heliconius), 90
 hyperana (Hastula), 18, 20, 68, 91, 92, 117
 hylas (Lycæna), 214, 224
 hylas (Polyommatus), 153, 196
 hyparchus (Pompostola), 125
 hypassia (Chalciope), 104
 hyperanthus (Aphantopus), 243
 hyperanthus (Enodia), 299
 hyperanthus (Epinephele), 156
 hyperborea (Agrotis), 10
 hypericæna (Catoptria), 68
 hypochiona (Lycæna), 17
 ianira (Epinephele), 40, 43, 112, 154, 238
 ianthina (Triphana), 20, 41
 icarus (Lycæna), 20, 40, 46, 66, 67, 114,
 154, 189, 214, 298
 icarus (Polyommatus), 20, 141, 150, 151,
 152, 215, 299, 300
 ichnusa (Vanessa), 102
 idas (Lycæna), 17, 20
 ilia (Apatura), 76, 197, 242, 303
 iliades (Apatura), 76
 ilicifolia (Epinaptera), 140
 ilicis (Thecla), 196, 198, 224, 225, 242,
 243
 imbutata (Carsia), 157
 immanata (Cidaria), 41, 57, 113
 immorata (Acidalia), 21
 immundella (Trifurcula), 260
 impluviata (Ypsipetes), 19
 impura (Leucania), 10, 155, 238
 inaria (Serrodes), 104

- incedens* (Boreia), 104
incerta (Taniocampa), 10, 142, 215, 216, 297
indeterminata (Ophiura), 101
iners (Amathes), 72
iners (Dyschorista), 72
ines (Melanargia), 258
infima (Leucania), 101
infuscata (Ennomos), 215
infuscata (Xylophasia), 210
ingenua (Aporophylla), 21
inguinata (Melanippe), 117
innotata (Eupithecia), 40, 206, 220
ino (Brentias), 76, 198, 248
inous (Lycænesthes), 239
inquinatellus (Crambus), 112
instabilis (Taniocampa), 21, 56
insignata (Eupithecia), 170, 171
insubrica (Cænonympha), 245
insularis (Anthocharis), 91, 100, 101
intercalaris (Arctia), 262
intermedia (Asthena), 33
interrogationis (Plusia), 41, 132, 154
inturbata (Eupithecia), 172
io (Vanessa), 13, 129, 154, 189, 198, 247, 297
iolas (Lycæna), 222
iota (Plusia), 68, 111
iphis (Cænonympha), 248
iris (Apatura), 76, 197, 242, 248
isogrammaria (Eupithecia), 22, 172
issyka (Arctia), 262
jacobææ (Euchelia), 191, 215, 256
jacobææ (Hippocrita), 294
janira (Epinephele), 7, 67
jasioneata (Eupithecia), 156, 208, 209, 301
jasius (Charaxes), 69, 102, 140, 167, 206
juniperata (Thera), 21
knysna (Zizora), 133
krishna (Papilio), 260
laburnella (Cenostoma), 239
laccertinaria (Platypteryx), 41
lachesis (Melanargia), 214, 258
lacteasparsa (Abraaxas), 295
lactemarginata (Cidaria), 295
lacticolor (Abraaxas), 261, 295
lacunana (Sericoris), 156
lambda (Graptolitha), 71
lambda (Rhizolitha), 71
lambdella (Oecophora), 102
lancealis (Perinephele), 106
lanceolana (Bactra), 157
lappona (Erebia), 244, 247
lapponnaria (Nyssia), 11, 15, 56, 117, 118, 215, 296, 301
lateralis (Epizygæna), 122
lateritia (Metarctia), 104
lathonia (Issoria), 76
lathyri (Leucophasia), 214
latona (Cytogramma), 104
lavendulæ (Zygæna), 224
lavateræ (Carcharodus), 152, 196, 224, 244
lefebvrei (Erebia), 259
leilus (Cydimon), 116
leilus (Urania), 116
leinardi (Diacrisia), 104
leporina (Acronycta), 22, 44, 93, 111
leptis (Homophylotus), 125
leucographa (Pachnobia), 297
leucomelas (Melanargia), 300
leuconoura (Grammoscelis), 70
leucophæa (Pachetra), 168
leucophasia (Eriannis), 216
leucophasia (Hybernia), 91, 110, 142, 215
leucophasia (Argyroglea), 70
leucostigma (Helotropha), 118
levana (Araschnia), 76, 198, 254
leopardi (Ophiura), 291
libatrix (Gonoptera), 89, 293
lichenæa (Eumuchitis), 72
lienigalis (Pyralis), 235, 291
ligea (Erebia), 248
lignata (Phibalapteryx), 112
ligneus (Cocynis), 133
ligniperda (Cossus), 154
ligula (Cerastis), 89
ligula (Conistra), 72
liguriata (Eupithecia), 170
ligustri (Acronycta), 57, 105
limbata (Ophiura), 104
limitata (Eubolia), 41, 68, 238
linariata (Eupithecia), 169
lineata (Deilephila), 257
linneella (Chrysoclista), 46, 192, 257
lirosa (Miana), 41, 67, 158, 238, 296
lithargyria (Leucania), 66, 67, 155, 238
lithodactylus (Udematophorus), 156
lithoxylea (Xylophasia), 66, 67, 153, 238
littoralis (Prodenia), 88, 263
litura (Amathes), 72
liturata (Macaria), 46, 216
liturata (Semiolitha), 216
livornica (Deilephila), 9, 46, 120, 257
lxella (Coleophora), 36
lobulata (Lobophora), 110
lohitia (Spindasis), 115
lonicææ (Anthrocera), 243
lonicææ (Zygæna), 46
loreyi (Leucania), 104
lorquiniaria (Acalla), 93
lota (Orthosia), 89
lubricipeda (Arctia), 154
lubricipeda alba (Bombyx), 278
lubricipeda (Spilosoma), 40, 89, 111, 216, 257, 295
lucernæa (Agrotis), 57, 156
lucidella (Aristotelia), 257
lucilla (Neptis), 303
lucina (Nemobius), 128, 152, 153, 224
lucipara (Euplexia), 155
luctuata (Euphyia), 119
luctuosa (Acontia), 46
lunaria (Sclenia), 89, 129

- lundana (Ancyliis), 90
 lunigera (Agrotis), 156
 lunosa (Anchocelis), 20, 112
 lunosa (Omphaloscelis), 71, 72
 lupia (Rhodogastria), 104
 lupulinus (Hepialus), 40
 luridata (Tephrosia), 216
 lutarella (Lathrosia), 19, 214, 296
 lutea (Cosmia), 72
 lutea (Leucania), 93
 luteago (Dianthocia), 10, 190, 300
 lutealis (Scopula), 68
 lutescens (Diacerisia), 104
 lutipennella (Coleophora), 42
 lutosa (Calamia), 105
 lutulenta (Aporophyla), 71
 lutulenta (Epunda), 21, 112
 lychnidis (Amathes), 72
 lychnitis (Cucullia), 239
 lycidas (Rusticus), 243
 lysimon (Lycæna), 134
 machaon (Papilio), 101, 149, 150, 151, 152, 162, 190, 214, 301
 macilenta (Anathes), 72
 Macroglossa, 205
 maculata (Venilia), 129, 298
 maculipennis (Plutella), 89
 maculosa (Arctia), 225
 madagascariensis (Crenis), 185
 mæra (Pararge), 116, 152, 195, 198, 223, 240, 299, 303
 maha (Zizera), 133, 236
 major (Zygæna), 240
 malvæ (Hesperia), 153, 191, 244
 malvæ (Syrichtus), 90, 298
 manni (Arctia), 262
 manto (Erebia), 245
 Marasmarcha, 259
 margaritaria (Metrocampa), 40
 margaritellus (Crambus), 67, 68, 157
 marginaria (Hybernia), 110, 116, 128, 142, 167, 297
 marginata (Tomaspilis), 40, 43
 marginata (Temnora), 104
 marginepunctata (Acidalia), 1, 46, 48
 maritima (Senta), 10, 19, 257
 marmorata (Cidaria), 113
 marmorea (Lita), 157
 marmorinaria (Erannis), 216
 *marshalli (Saliuncella), 124
 *Matumbia, 124
 mathewi (Ctenonympha), 18, 30
 matura (Cerigo), 238
 maturna (Melitea), 76
 maurita (Spodoptera), 120, 205
 meda (B.), 104
 medesicaste (Thais), 150, 152, 196, 223
 medusa (Erebia), 76, 198
 megera (Euchloron), 104
 megera (Pararge), 104, 150, 152, 189, 303
 melampus (Erebia), 244
 Melanippe, 119
 melanocephala (Acronycta), 22
 melanopa (Anarta), 57, 301
 *Melanopoda (Alucita), 284
 melanops (Nomiades), 151, 153, 196
 melanozona (Abraxas), 295
 melas (Erebia), 259
 meleager (Polyommatus), 78
 *Melisomina, 127
 meliloti (Anthrocera), 239
 mendica (Spilosoma), 13, 216
 mensuraria (Eubolia), 41
 menthastri (Spilosoma), 40, 111, 155, 257, 278
 menyanthidis (Acronycta), 44, 57
 merope (Heteronympha), 141
 merope (Melitea), 247
 Metanycles, 123
 metis (Apatura), 303
 mi (Lucilia), 90, 153
 miata (Cidaria), 42, 57
 micæa (Hydræcia), 41, 89
 microsticha (Hypizygæna), 121
 miegii (Chrysophanus), 258
 milvipennis (Coleophora), 20
 Mimacrea, 115
 *mimetica (Saliunca), 123
 minima (Cupido), 105, 152, 189, 196
 miniosa (Tæniocampa), 16
 minos (Anthrocera), 18, 247
 minos (Zygæna), 18, 21, 92
 minutata (Eupithecia), 171
 misippus (Hypolimnas), 134
 mnemosyne (Parnassius), 224, 245
 mnestra (Erebia), 245, 246, 303
 monacha (Liparis), 44
 monacha (Lymantria), 10, 70, 240
 moneta (Plusia), 13, 40, 42, 66, 89, 129, 189, 192, 213, 301
 monoglypha (Xylophasia), 19, 66, 67, 153, 158, 238, 240, 296
 montanata (Melanippe), 68, 155
 morpheus (Caradrina), 67, 89, 111
 morpheus (Heteropterus), 76
 multistrigaria (Larentia), 19, 20, 40, 92
 munda (Tæniocampa), 216
 mundana (Nudaria), 67, 129, 153
 munitata (Coremia), 41, 57
 muralis (Bryophila), 20
 muralis (Jaspidea), 20
 muricata (Hyria), 239
 murinata (Minoa), 298
 muscerda (Lithosia), 43, 106, 117
 musciformis (Sesia), 156
 muscosa (Agrotis), 104
 mutata (Andriasa), 104, 292
 myopæformis (Egeria), 19
 myopæformis (Sesia), 19
 myricæ (Acronycta), 57
 myrtilana (Phoxopteryx), 128
 myrtilli (Anarta), 153, 157, 191
 nama (Hestina), 260
 nana (Dianthocia), 301
 nanata (Eupithecia), 68, 153, 156
 napææ (Pieris), 259

- napi (Pieris), 40, 68, 91, 107, 140, 154, 162, 189, 214, 238, 246, 259, 297, 298
 napi (Pontia), 162
 nebulosa (Aplecta), 10, 44, 67, 113, 153, 168, 298
 neglecta (Agrotis), 118
 neglecta (Noctua), 142, 301
 neomiris (Satyrus), 103
 neoridas (Erebica), 78
 nerii (Charocampa), 65, 120
 nerii (Daphnis), 65, 134, 141, 214, 292
 *Netrocera, 126
 neuropterella (Parasia), 257
 neustria (Malacosoma), 44, 239
 nicholii (Erebica), 259
 nigra (Aporophyla), 58, 71, 257
 nigra (Epunda), 41
 nigrescens (Orthosia), 240
 nigricans (Agrotis), 238
 nigrocincta (Antitype), 72
 nigrocincta (Polia), 10, 299, 300
 nigrofasciaria (Anticlea), 41
 nigrofulvata (Macaria), 46
 nigrolutea (Abraxas), 295
 nimba (Carpocapsa), 46
 *nitens (Saliunca), 122
 niveata (Cicogene), 261
 nubeculosa (Asteroscopus), 90
 nubeculosa (Brachionycha), 71
 nubeculosa (Petasia), 55, 93
 nubilata (Eupithecia), 171
 noctuella (Nomophila), 156
 notha (Brepheos), 297
 nupta (Catocala), 18
 nymphæata (Hydrocampa), 68
 obelisca (Agrotis), 20
 obfuscaria (Dasydia), 40
 oblongata (Eupithecia), 240
 obscura (Agrotis), 262
 obscura (Erebica), 244
 obscura (Lycæna), 214, 247, 295
 obscuraria (Gnophos), 67, 68
 obsoleta (Argiades), 261
 obsoleta (Lycæna), 46, 240
 ocularis (Cymatophora), 105
 occulta (Aplecta), 57
 ocellaris (Cosmia), 72
 ocellaris (Orthosia), 257
 ocellaris (Xanthia), 12
 ocellata (Melanthia), 19, 57, 68
 ocellata (Opsigalea), 70
 ocellata (Smerinthus), 46, 215
 ocellatus (Smerinthus), 10, 111, 139
 *ochracea (Bylisia), 127
 ochracea (Eupithecia), 171
 ochracea (Mamestra), 191
 ochrata (Acidalia), 296
 ochroleuca (Eremobia), 19
 ochenheimeriana (Pamene), 257
 octomaculata (Ennychia), 298
 oculea (Apamea), 41
 Eceticus, 239
 cenistis (Andesia), 70
 oleagina (Valeria), 20, 72
 oleracea (Hadena), 67, 153, 238
 olivacea (Polia), 153
 olivata (Larentia), 41, 154, 158
 omphale (Teracolus), 18
 Oncoenemis, 70
 oo (Dicycla), 105
 ophiogramma (Hadena), 257
 opima (Tæniocampa), 21, 92, 105, 110, 216
 opina (Dryotype), 70
 optileto (P.), 245, 247
 orbitulus (P.), 245, 247
 orbona (Triphena), 41, 58, 67, 155
 orcadensis (Eupithecia), 71
 orichalcea (Plusia), 295
 orion (Diphthera), 117
 orion (Lycæna), 214
 orion (Moma), 301
 *ornata (Callibaptis), 127
 ornata (Lycæna), 44
 ornithopus (Graptolitha), 71
 ornithopus (Xylina), 168
 osseana (Aphelia), 91
 oxyacanthæ (Meganephira), 72
 oxyacanthæ (Miselia), 21, 72, 89
 oxygramma (Plusia), 104
 paradoxa (Pseudopontia), 20
 pagodæ (Copitype), 70
 palemon (Carterocephalus), 128
 paleno (Colias), 245, 247, 261
 paleacea (Cosmia), 58, 118
 palealis (Loxstego), 257
 palealis (Spilodes), 240
 pales (Brenthis), 244, 247
 pallens (Leucania), 155, 238
 pallescentella (Tinea), 42
 pallida (Erebica), 244
 pallida (Tæniocampa), 191
 pallifrontana (Stigmonota), 22
 paludis (Hydracia), 10
 paludum (Acipitilia), 187, 235
 paludum (Buckleria), 144, 187, 235
 paludum (Trichoptilus), 293
 palustris (Hydrilla), 106
 pamphilus (Gonomypha), 43, 112, 153, 154, 189
 pandora (Argynnis), 103, 303
 pandora (Dryas), 77
 paphia (Argynnis), 103, 189, 191, 215
 paphia (Dryas), 76, 77, 240
 papilionaria (Geometra), 158, 240, 302
 pardus (Entomogramma), 104
 parthenias (Brepheos), 110, 297
 parthenie (Melitæa), 245
 parthenoides (Synemon), 141
 pascuella (Crambus), 90
 pasiphæ (Epinephele), 258
 pastinum (Toxocampa), 93
 pavonia (Saturnia), 216, 301
 pechi (Anthocharis), 91
 pectinitaria (Larentia), 153
 pedaria (Phigalia), 110, 116, 128

- peletieraria (Cleogene), 261
 peltigera (Heliothis), 11, 21, 120, 237, 301
 pendularia (Ephyra), 57
 pendularia (Zonosoma), 57
 penkleriana (Grapholitha), 91
 pennaria (Himera), 66, 129, 300
 penziana (Sciaphila), 91
 perfumaria (Boarmia), 301
 perfuscata (Cidaria), 113
 perla (Bryophila), 238
 perlellus (Crambus), 68
 petraria (Panagra), 68
 phalanta (Atella), 134
 pharte (Erebia), 247, 303
 phicomone (Colias), 244, 245, 247, 299
 philoxenus (Cænonympha), 111
 phlæas (Chrysophanus), 19, 21, 40, 67, 150, 214, 216, 234, 238
 phlæas (Polyommatus), 154, 158, 240
 phlæas (Rumicia), 19, 94
 phœbe (Melitæa), 151, 153, 196, 224, 243
 phorobanta (Papilio), 134
 phragmitellus (Chilo), 192, 215
 phragmitidis (Calamia), 19, 238
 picata (Cidaria), 295
 piceata (Cidaria), 24
 pictaria (Aleucis), 191
 pigra (Pygæra), 22
 pilosaria (Phigalia), 89, 110, 117
 pilosella (Oxyptilus), 87
 Pinacopteryx, 298
 pinastri (Sphinx), 44, 212
 pinarius (Bupalus), 40
 piniperda (Trachea), 190
 pinguinella (Gelechia), 42, 43
 pinguis (Euzophora), 106
 pisi (Hadena), 67, 153
 pistacina (Amathes), 72
 pitho (Erebia), 248
 placens (Hypnotype), 70
 plagiata (Anaitis), 141
 plantaginis (Chelonia), 153, 154
 plantaginis (Nemeophila), 112, 157
 plantaginis (Parasemia), 294
 plecta (Agrotis), 46
 plecta (Noctua), 41
 plexippus (Anosia), 162
 plexippus (Danais), 299
 plumbeolata (Eupithecia), 172
 plumifera (Oreopsyche), 214
 pluto (Erebia), 246
 podalirius (Papilio), 150, 152, 211, 214, 224, 240, 254
 podana (Tortrix), 68, 111
 *pœcia (Arnisœra), 125
 polaris (Vanessa), 19
 pollux (Erebia), 244
 polychloros (Eugonia), 150, 152
 polychloros (Eu Vanessa), 242, 243
 polychloros (Vanessa), 13, 142, 198, 297
 polycommata (Lobophora), 128
 polygonalis (Mecyna), 239
 polyodon (Xylophasia), 296
 polysperchon (Lycæna), 200
 polyxena (Thais), 116, 214
 pomifoliella (Lithocolletis), 141
 pomonella (Carpocapsa), 234
 Pompostola, 125
 populata (Cidaria), 68, 153, 158
 populeti (Tæniocampa), 89, 105
 populi (Amorpha), 215, 300
 populi (Limenitis), 76, 197, 243, 298
 populi (Pæniclocampa), 42
 populi (Smerinthus), 22, 111
 porcellus (Chærocampa), 240
 porima (Araschnia), 199
 porphyria (Agrotis), 41, 153
 porrinata (Nemoria), 117
 postica (P.), 104
 potatoria (Cosmotriche), 262
 potatoria (Odonestis), 67, 139, 166, 235
 prelatella (Lampronia), 157
 prasina (Aplecta), 261
 proboscidalis (Hypena), 68
 procellata (Melamppe), 117
 processionea (Cnethocampa), 214
 procida (Melanargia), 197
 procioides (Epizygæna), 121
 progemmaria (Hybernia), 110, 167
 pronœ (Erebia), 248, 303
 pronuba (Triphæna), 41, 67, 155, 158, 238
 pronubana (Tortrix), 17, 20, 43, 91, 162, 168, 191, 211, 239, 299
 prorsa (Araschnia), 76, 199
 prosapiaria (Ellopiea), 40, 302
 protea (Dichonia), 71
 protea (Dryobota), 71
 protea (Eumichtis), 71, 72
 protea (Hadena), 21, 89, 116
 protea (Polia), 71
 provincialis (Melitæa), 151, 153, 196
 proximaria (Boarmia), 104
 pruinana (Penthina), 156
 prunaria (Angerona), 15, 142, 240, 295, 301
 pruni (Aglaope), 214
 pruni (Strymon), 256
 pruni (Thecla), 26, 76, 105, 198, 242, 290
 pryrella (Myelois), 8
 pseudonominion (Parnassius), 242
 pseudospretella (Borkhausenia), 42, 43, 261
 psi (Acronycta), 41, 119, 138
 pterodactylus (Stenoptilia), 144
 pudibunda (Dasychira), 13, 240, 299
 pudica (Euprepia), 225
 pulchella (Deiopeia), 12, 42, 214
 pulchellata (Eupithecia), 89, 116, 221
 pulchrina (Plusia), 68, 111
 pullata (Gnophos), 116
 pulveraria (Numeria), 18, 111, 212, 298
 pulverulenta (Tæniocampa), 297
 pumilata (Gymnoscelis), 170, 222

- pumilata (Eupithecia), 141, 156
 punctaria (Ephyra), 16, 111
 punctaria (Zonosoma), 128
 punctata (Phalana), 279
 punctularia (Tephrosia), 128, 298
 purpuralis (Anthrocera), 18
 purpuralis (Zygana), 18
 purpurata (Rhyparia), 195, 225
 purpurea (Austromathes), 71
 pustulata (Euchloris), 261
 puta (Agrotis), 44, 190
 putrescens (Leucania), 301
 putris (Axyliu), 66, 67, 89
 pygmaea (Lithosia), 19, 296
 pyralina (Calymnia), 89, 93
 pyri (Saturnia), 214, 239
 quadrifaria (Psodos), 116
 quadripunctata (Caradrina), 67
 quercana (Hylophila), 105
 quercifolia (Gastropacha), 23
 quercinaria (Ennomos), 215
 quercus (Bithys), 256
 quercus (Lasiocampa), 18, 40, 139, 235, 243
 quercus (Thecla), 105, 113
 rapae (Pieris), 18, 40, 89, 140, 153, 189, 214, 238, 259
 raphani (Pieris), 91
 raveda (Agrotis), 105
 rectilinea (Hadena), 57
 renardii (Mamestra), 191
 repandata (Boarmia), 113, 215, 262, 301
 resinella (Retinia), 220
 revayana (Sarrothripus), 142
 rhadamanthus (Zygana), 224
 rhamnata (Scotisia), 186
 rhamni (Gonepteryx), 152, 186, 191, 214, 244, 294, 297
 rhomboidaria (Boarmia), 113
 ribeana (Tortrix), 68
 ribeata (Eupithecia), 170
 ripe (Agrotis), 301
 roborana (Spilonota), 157
 roboraria (Boarmia), 70, 240, 261
 robsoni (Aplecta), 10
 roderaria (Eupithecia), 170
 rosina (Heliconius), 90
 rothleibii (Cænonympha), 46, 111
 rubricosa (Pachnobia), 89
 rubidata (Anticlea), 42, 156
 rubiginea (Conistra), 72
 rubi (Bombyx), 155, 216
 rubi (Callophrys), 90, 151, 152, 189, 256
 rubi (Macrothylacia), 155
 rubi (Noctua), 67, 153
 rubi (Thecla), 40, 156, 256
 rubrobasalis (Pinacopteryx), 298
 rufa (Cænobia), 300
 rufa (Leucania), 93, 295
 rufago (Jodia), 71
 rufescens (Metarctia), 104
 rufina (Anchocelis), 41, 140
 rumicis (Acronycta), 44
 rumina (Thais), 214
 rupicaparia (Hybernia), 128
 ruralis (Botys), 16
 ruralis (Sylepta), 16
 rurea (Xylophasia), 41, 57, 153
 russata (Cidaria), 113, 153
 rustica (Spilosoma), 216
 rusticata (Acidalia), 120
 rutilus (Chrysophanus), 145, 175, 259
 sacraria (Sterilia), 105
 salicata (Larentia), 153, 154, 158
 salicis (Leucoma), 105
 *Saliuncella, 124
 salmactis (Lycæna), 46
 salustius (Chrysophanus), 18
 sao (Pyrgus), 78, 152, 153, 196
 sao (Syrichthius), 103
 sarpedon (Zygana), 214
 satelitia (Eupsilia), 72
 satellitia (Scopelosoma), 56, 297
 satura (Eumichtis), 72
 saturnana (Diceranympha), 91
 satyrata (Eupithecia), 172
 satyrion (Cænonympha), 215, 247
 saucia (Agrotis), 44, 89
 sauciana (Penthina), 129
 scabiosata (Brenmatogo), 170
 scabrinseula (Dipterygia), 87, 239
 schiefeleri (Eupithecia), 171
 schulziana (Mixodia), 67, 157
 scipio (Erebia), 78
 scitula (Rhynchaglaia), 70
 scolopacina (Xylophasia), 129, 215
 scoparia (Cheligaica), 70
 segetum (Agrotis), 46, 47, 101, 155
 seladonia (Polia), 71
 selenampha (Amyna), 101
 selene (Argynnis), 44, 154, 156
 semiargus (Nomiades), 39, 153, 198, 247
 semibrunnea (Lithophane), 71
 semele (Hipparchia), 77, 78, 299
 semele (Satyrus), 22, 40, 66, 67, 91, 103
 senescens (Butalis), 219
 serena (Hecatera), 89
 setioides (Netrocera), 123, 126
 severina (Belenois), 114
 sibylla (Limnitis), 9, 42, 76, 189, 198, 242
 sicula (Drepana), 10, 295
 sidæ (Hesperia), 151
 signata (Plusia), 104
 silaceata (Cidaria), 261
 silaceata (Larentia), 240
 silago (Cosmia), 72
 silago (Xanthia), 41
 similis (Porthesia), 238
 simplex (Anthona), 101
 simulata (Thera), 154
 sinapis (Leptosia), 152
 sinapis (Leucophasia), 78, 150, 156, 195, 198, 214
 sinope (Urota), 103

- sinuella (Homocosoma), 257
 smaragdaria (Phorodesma), 261
 sobrinata (Eupithecia), 16, 154, 158, 173
 socia (Lithopane), 57
 sociata (Melanippe), 68
 sociella (Aphonua), 68
 solidaginis (Calocampa), 57
 solidaginis (Cloantha), 71
 solidaginis (Eupithecia), 209
 sordidata (Hypsipetes), 68, 153, 158, 300
 sordidata (Ypsipetes), 19, 41
 sparganii (Nonagria), 10, 14, 93
 spartiata (Chesias), 42
 sphinx (Asterocephalus), 71, 105
 sphinx (Brachionycha), 71
 sphinx (Petasia), 71
 spini (Thecla), 196, 214
 splendida (Argyromata), 70
 Spilosoma, 253
 stabilis (Terniocampa), 13, 142, 191, 297
 statilinus (Satyrus), 78, 214, 258
 stellatarum (Macroglossa), 14, 20, 129, 214, 290
 stephensi (Momphe), 257
 stevensata (Eupithecia), 173
 stigmatica (Noctu), 22
 stolidia (Chalciope), 104
 straminea (Conchylis), 68
 straminea (Leucania), 10, 19, 105
 stramineola (Lithosia), 40, 43
 strataria (Biston), 142
 striaria (Orthotoma), 157
 strigata (Hemitheta), 155
 strigata (Rancora), 71
 strigularia (Acidalia), 296
 strigilis (Miana), 41, 67, 105, 111, 156
 strigosa (Acronycta), 105
 strigula (Agrotis), 41
 strobilata (Eupithecia), 170
 stygne (Erebia), 224, 244
 subcapucina (Peronea), 117
 subciliata (Eupithecia), 173, 299
 subjectana (Cnephassa), 90
 subjectana (Sciaphila), 157
 sublustris (Xylophassa), 105, 296
 subnotata (Encymatoge), 170
 subradiata (Lycæna), 239
 subretracta (Hypsa), 25, 107
 subroseata (Ephyra), 118
 subsericeata (Acidalia), 156
 subseque (Triphana), 192
 substriata (Agrotis), 22
 subtristata (Melanippe), 155
 subtusa (Tetha), 18
 subviolacea (Abraxas), 295
 succenturiata (Eupithecia), 173
 suffumata (Cidaria), 24, 113, 298
 sugriva (B.), 43
 suspecta (Amathes), 72
 suspecta (Orthosia), 57, 129
 syllus (Melanargia), 214
 sylvanus (Hepialus), 90
 sylvanus (Hesperia), 154
 sylvanus (Pamphila), 189
 sylvata (Asthenia), 33
 sylvestrana (Retinia), 253
 syringaria (Pericallia), 89, 129
 tages (Nisoniades), 90, 111, 150, 152, 244, 298
 tages (Thanaos), 111, 300
 tagis (Anthocharis), 91, 100, 101, 151, 196
 tamariscata (Eupithecia), 206
 taras (Hesperia), 191
 taraxaci (Caradrina), 67
 telecanus (Lycæna), 134
 temerata (Bapta), 191
 templi (Dasypolia), 72
 tenebrosa (Rusina), 156
 tenella (Psyche), 183
 tenuiata (Eupithecia), 172
 tephradactylus (Leioptilus), 117, 156
 Tephroclystis 169
 Teracolus, 116
 terrealis (Botys), 156
 tersata (Comocalpa), 170
 tersata (Phibalapteryx), 170
 testacea (Asthenia), 83
 testata (Cidaria), 41, 153, 154, 158
 testacea (Luperina), 46
 thalassina (Hadena), 67, 111
 thaumas (Hesperia), 90, 300
 therapne (Pyrgus), 78
 therapne (Syrichthus), 103
 thetis (Melanargia), 258
 thymaria (Hemitheta), 240
 tigellus (Pararge), 103
 tiliæ (Smerinthus), 231, 234, 262
 tiliaria (Ennomos), 112
 tiliaria (Eugonia), 112
 tincta (Aplecta), 153
 tiphon (Cononympha), 162
 tiphys (Netrocera), 126
 tipuliformis (Sesia), 252
 tiresias (Lycæna), 200
 tithonus (Epinephele), 67
 tithonus (Satyrus), 262
 tityrella (Nepticula), 257
 togata (Encymatoge), 169
 togata (Eupithecia), 169, 170, 221
 tragopogonis (Amphipyra), 41
 trapezina (Cosmia), 112, 264
 trauniana (Stigmonota), 106
 tremulæ (Limenitis), 298
 *triangularis (Anomæotes), 121
 Trichoridia, 70
 tricolor (Anthrena), 104
 tricolor (Coleophora), 36
 tridens (Acronycta), 119, 138
 trifolii (Anthrocera), 239
 trifolii (Zygæna), 225, 240
 trigeminana (Ephippiphora), 68
 trijuncta (Neumichtes), 70
 trilinea (Grammesia), 240
 triops (Pararge), 116
 tripartita (Habrostola), 68
 triplasia (Habrostola), 111
 trisignaria (Eupithecia), 221
 tristata (Melanippe), 57

tristellus (Crambus), 68
tritici (Agrotis), 19, 41, 158, 296
truncata (Oidaria), 113
tyndarus (Erebina), 78, 214, 245, 247, 258
typhae (Nonagrii), 10, 41, 93
typhon (Ctenonympha), 40, 46, 111, 151, 162
**uganda* (Netrocera), 126
uliginosellus (Crambus), 156
ulmiata (Abraaxas), 262, 298
ulmi (Uropus), 214
Ulochlena, 71
ulvae (Senta), 105
umbratica (Cucullia), 68
umbratica (Callenia), 71
umbrosa (Noctua), 66
unangulata (Melanippe), 119
unanymis (Aparnea), 41
unanymis (Hadena), 22
unicolor (Cirrhoedia), 295
unipuncta (Leucania), 13, 237, 263
upsilon (Orthosia), 240
urticae (Aglais), 19, 43, 152, 260, 299, 300
urticae (Spilosoma), 301
urticae (Vanessa), 19, 43, 76, 89, 129, 154, 198, 214, 238, 297, 300
urticana (Sericoris), 156
vaccinii (Cerastes), 46, 56, 297
vaccinii (Conistra), 72
vacuella (Ochsenheimeria), 257
valerianata (Eupithecia), 158
valezina (Argynnis), 103
valezina (Dryas), 77, 280
varia (Melitæa), 245
variata (Thera), 41
varylata (Abraaxas), 24
velleda (Hepialus), 67, 129, 154
venosata (Eupithecia), 116, 171, 221
**ventralis* (Saliunca), 123

verannes (Charaxes), 104
verbasci (Cucullia), 239
versicolor (Dimorpha), 141
vestigialis (Agrotis), 46, 158, 238, 296
**vetulina* (Chalcophylax), 124
vetusta (Xylina), 71
vigintipunctatus (Yponomeuta), 192
villica (Aretia), 10, 20, 139, 156, 225, 239, 294
viminalis (Bombycia), 71
viminalis (Cleocera), 214
vinula (Diceranura), 41, 257
viretata (Lobophora), 301
virgata (Agrotis), 299
virgaurea (Chrysophanus), 214, 248, 258
virgaureata (Eupithecia), 172, 206, 208, 210, 220
viridana (Tortrix), 129
viridaria (Larentia), 41
viridata (Nemoria), 117, 215
vitalbata (Phibalapteryx), 170
vitellina (Leucania), 10, 40, 256, 301
vittata (Phibalapteryx), 112
vulgata (Eupithecia), 172
w-album (Edwardsia), 256
w-album (Strymon), 19, 90
w-album (Thecla), 19, 77, 89, 198, 256
xanthographa (Noctua), 20, 155, 158, 192
xanthomelas (Vanessa), 303
xanthomista (Polia), 157, 299, 300
**xanthosoma* (Epizygma), 121
xerampelina (Atethmia), 72
xerampelina (Cirrhoedia), 72, 295, 299
xerampelina (Orthosia), 257
xerampelina (Xanthia), 112
zephyrus (Rusticus), 243
ziczac (Notodonta), 10, 41, 111
zonaria (Nyssia), 118

NEUROPTERA.

ænea (Cordulia), 19, 30, 275
Æschna, 32
annulatus (Cordulegaster), 31, 32
arctica (Somatochlora), 31
armatum (Agrion), 30, 32
aspersus (Mesophylax), 163
attenuata (Croce), 263
cærulea (Æschna), 31
cærulescens (Orthetrum), 30
cancellatum (Orthetrum), 32
cyanea (Æschna), 14, 15, 31, 32, 33, 275
cyathigerum (Enallagma), 14, 15, 30, 31, 33, 213, 214, 275
depressa (Libellula), 15, 275
dryas (Lestes), 66
elegans (Ischnura), 14, 33, 213, 257, 275
elegans, var. *infuscans* (Ischnura), 213, 257, 275
fissa (Micropterna), 163
flaveolum (Sympetrum), 19, 32, 277

fusca (Sympycna), 163
germanica (Panorpa), 16, 67
germanica, var. *borealis* (Panorpa), 16
gigantea (Petalura), 263
grandis (Æschna), 14, 15, 31, 32, 33, 275
imperator (Anax), 14, 15, 30, 31, 276
isosceles (Æschna), 32
junceæ (Æschna), 30, 31, 33
mercuriale (Agrion), 30, 32
mixta (Æschna), 31
naias (Erythromma), 213, 257
nymphula (Pyrrhosoma), 30, 31, 33, 257, 274
nymphula, var. *æneatum* (Pyrrhosoma), 30
pennipes (Platycnemis), 30, 257
pratense (Brachytron), 275
puella (Agrion), 14, 15, 30, 33, 213, 257, 275

pulchellum (*Agrion*), 14, 33, 213, 257
 pumilio (*Ischnura*), 30, 31, 32
 pumilio, var. *aurantiacum* (*Ischnura*),
 30
 quadrimaculata (*Libellula*), 15, 30, 31,
 33
 radiatus (*Halesus*), 138
 sanguineum (*Sympetrum*), 15, 19, 259,
 275, 276
 scoticum (*Sympetrum*), 19, 30, 31, 32,
 33, 289

splendens (*Calopteryx*), 14, 33, 257
 sponsa (*Lestes*), 33, 276
 stagnalis (*Holocentropus*), 163
 striolatum (*Sympetrum*), 14, 19, 31, 32,
 33, 276, 277
 tenellum (*Pyrhosoma*), 30, 31
 tenellum, var. *æneatum* (*Pyrhosoma*),
 32
 virgo (*Calopteryx*), 30, 31, 32, 260
 vulgatissimus (*Gomphus*), 30, 31
 vulgatum (*Sympetrum*), 17, 19, 32, 277

ORTHOPTERA.

Acridium, 95
ægypticum (*Acridium*), 22, 141
albipennis (*Apterygida*), 259
americana (*Periplaneta*), 88
annulipes (*Anisolabis*), 54
arachidis (*Apterygida*), 54
auricularia (*Forficula*), 51, 54, 203
auricularia var. *forcipata* (*Forficula*), 51
australasiæ (*Periplaneta*), 22, 88
Bacillus, 74, 147
bicolor (*Stenobothrus*), 52, 54
bipunctatus (*Tettix*), 52, 53, 55
Blatta, 91
brachyptera (*Platypleis*), 53, 55
**brauneri* (*Callimenus*), 249, 250, 271,
 272, 273
burmeisteri (*Epilampa*), 22
Callimenus, 248, 270, 271, 272, 273, 274
campestris (*Gryllus*), 38, 85
cinereus (*Thamnotrizon*), 55, 298
crurifolius (*Pulex*), 73, 163
cubensis (*Blabera*), 95
dilatatus (*Callimenus*), 250, 271, 272,
 273, 274
domesticus (*Gryllus*), 38, 85
dorsale (*Xiphidium*), 55
elegans (*Stenobothrus*), 22, 52, 54, 255
fasciatus (*Æcanthus*), 38, 85
germanica (*Phyllodromia*), 88
grisea (*Platypleis*), 53
grossus (*Mecostethus*), 52, 54
holosericea (*Nyctibora*), 88
inflatus (*Callimenus*), 271
lapponica (*Ectobia*), 54
latipes (*Callimenus*), 271, 273

lesnei (*Forficula*), 52, 54
leucogramma (*Phoraspis*), 92
livida (*Ectobia*), 54
longicollis (*Callimenus*), 250, 271, 272,
 273
macrogaster (*Epippiger*), 271
maculatus (*Gomphocerus*), 52, 54
montandoni (*Callimenus*), 249, 250, 270,
 271, 272, 273
morio (*Chelisoches*), 203
oniscus (*Callimenus*), 250, 271, 272, 273,
 274
orientalis (*Blatta*), 88, 110
pancei (*Callimenus*), 251, 271, 272
panzeri (*Ectobia*), 54
parallelus (*Stenobothrus*), 52, 54, 255
Phyllium, 73, 147
punctatissima (*Leptophyes*), 55
pyriformis (*Eutermes*), 263
restrictus (*Callimenus*), 249
roeselii (*Chelidoptera* [*Platypleis*]), 255,
 259
rossi (*Bacillus*), 299
rufipes (*Stenobothrus*), 52
scythe (*Phyllium*), 73, 75
scythe (*Phyllium* [*Pulex*]), 163
succinctum (*Acridium*), 47
talpoides (*Hemimerus*), 140
Tryxalis, 85
varium (*Mecostethus*), 55
verrucivorus (*Decticus*), 259
virescens (*Panchlora*), 22
viridissima (*Locusta*), 53, 230
viridulus (*Stenobothrus*), 54

On March 24th I went up to Eshowe, in Zululand. The country here lies high, and is well-watered. One particular stream was very beautiful, flowing in a series of falls and rapids, the falls sometimes being sixty feet to eighty feet high. Here I saw several times but failed to capture *Papilio ophidicephalus*. On one occasion I actually broke the tails off one, and then it escaped. Up here, and also on the South Coast, *Harma alci-meda* was abundant, and amongst them I took several male *H. coranus*. Another nice insect, which I only took here, was *Hypolycaena burtoni*, of which I took several examples along the paths. Probably the commonest butterfly here was *Lethe indosa*, which haunted the more shady portions of the bush. In the open, on the grass veldt, were many examples of the genus *Precis*.

I then returned to Durban, where I found things getting much scarcer. On the sand just above high-water mark I took a nice series of a *Cicendela*, which absolutely matched the colour of the sand on which it was in the habit of running. A big electric light in the Musgrave Road yielded many moths and a few beetles, amongst which I obtained a new Longicorn (*Gahania simmondsi*, Dist.). A visit to Pietermaritzburg and Howick yielded a nice series of *Alaena amazoula*, and I also saw *Papilio echerioides* on one of the hill-tops, but failed to effect a capture. The last two or three days were spent at Amanzinitoti, on the South Coast, but the only fresh things obtained here were *Deudorix antalus* and a single specimen of *Hamanumida dædalus*. This ended my collecting in South Africa, except for a few hours at Cape Town, on the Lion's Head, where I only obtained a few Lycænidæ.

I have by no means given a full list of the species taken, but only of the more interesting ones. I left Durban on April 19th by the turbine steamship 'Miltiades,' and after a very pleasant trip reached London on May 13th.

A NEW SPECIES OF *TREMEX* (SIRICIDÆ) FROM BORNEO.

By P. CAMERON.

Tremex viridiceps, sp. nov.

Black; the head dark green, densely covered with long white pubescence, the thorax largely tinged with a darker green, a large triangular mark on the sides of prothorax, metanotum, the first abdominal segment, except narrowly in the middle, and broad bands on the sides of the second to fourth abdominal segments, pale yellow; the tibiæ and tarsi dark testaceous, the posterior darker coloured than the four anterior. Wings hyaline, the radial cellules and the apex

smoky, the stigma dark testaceous, the costa and other nervures black. ♀. Length 11 mm.

Kuching. October (J. Hewitt).

Head and thorax closely strongly punctured, the head more strongly than the latter. Antennæ from the third joint flattened, the third narrowed, of equal width. Pubescence longer and denser on the front than on the rest of the head. Antennæ 14-jointed, the joints towards the apex bearing short stiff black hairs. Ovipositor short, narrow.

T. insularis, Sm. from Sarawak I do not know, but from the description I would separate it from the present species thus:—

Apical joints of antennæ yellow, only the first two and	
the last abdominal fasciæ interrupted, the others	
continuous	<i>insularis</i> .
Antennæ entirely black, the abdominal marks all widely	
separated	<i>viridiceps</i> .

SOME BEES COLLECTED BY DR. F. C. WELLMAN IN WEST AFRICA.

By T. D. A. COCKERELL.

Mesotrichia chiyakensis, sp. nov.

♀. Length, 30 mm. or a fraction less; anterior wing about 26 mm.; width of head, $10\frac{1}{2}$ mm. Black, with bright lemon-yellow hair on the mesopleura, the hind margin of thorax, and the first abdominal segment; hair of face and anterior part of thorax, and also of legs and abdomen except first dorsal segment, coarse and black. Vertex broad, shining, with very sparse but strong punctures; frontal keel low, grooved, not nearly reaching clypeus; third antennal joint longer than 4 + 5; mesothorax densely punctured at the sides, the disc smooth and impunctate; wings exceedingly dark.

Hab. Chiyaka, Benguella, West Africa, September 1st, 1907; at flowers of mint (F. C. Wellman, 1239).

A very fine species, of the general type of *Mesotrichia caffra* (L.), but larger, and with yellow hair on the pleura. It belongs to a little group typified by *M. inconstans* (Smith), separable thus:—

- | | |
|---|--------------------------------|
| Length, 26–26 mm.; anterior wing, 21–23 mm. | 1. |
| Length, 30 mm.; anterior wing, 26 mm.; scutellum | |
| with yellow hair | <i>M. chiyakensis</i> , Ckll. |
| 1. Scutellum and first abdominal segment with white | |
| hair (Abyssinia, White Nile, Tanganyika) | <i>M. inconstans</i> (Sm.). |
| Scutellum with yellow hair (Senegal) | <i>M. flavescens</i> (Vachal). |

In 1881 Radoszkowski recorded *M. inconstans* from Ilumbe, to the south of Benguella. That this was the genuine *inconstans* I cannot believe; it may possibly have been *chiyakensis*.

Ceratina geigeriae, sp. nov.

♀. Length about $7\frac{1}{2}$ mm. (8 with head thrust forward); black; strongly and very densely punctured, including the disc of the mesothorax; wings strongly darkened, clypeus with a broad dull yellow band; tubercles yellow; a cream-coloured stripe on anterior femora beneath, and the basal half of their tibiae above, and a very small spot at base of hind tibiae; no distinct keel on apical segment of abdomen; hind margins of segments punctured; apex a broad triangle.

In Friese's table of African *Ceratina* it runs to *C. sulcata*, which I have from Dr. Brauns. It is, indeed, very close to *sulcata*, but differs from the South African species by the clypeal mark being rounded above, not expanded laterally, the absence of a shining space just above the sides of the clypeus, the darker flagellum, and the smaller size. The middle of the clypeus is not distinctly sulcate, as it is in *sulcata*.

C. lineola, Vachal, from Delagoa Bay, must also be very similar, but its wings are scarcely infumated. It is also a little smaller.

Hab. Chiyaka, Benguella, West Africa; at flowers of *Geigeria*, September 1st, 1907 (F. C. Wellman, 1241, part). *Geigeria* is a genus of Compositæ.

Gronoceras nigrocincta (Rits.).

Chiyaka, Benguella, September 1st, 1907; one female found dead in a spider's web (F. C. Wellman). This fine species agrees well with Ritsema's coloured figure of *Megachile nigrocincta*. It is evidently a *Gronoceras*; indeed, Ritsema remarks that it is close to *G. combusta*. The mandibles have two apical teeth, and a long inner cutting edge; clypeus with a little broadly truncate process on middle of apical margin; claws simple; hair of head, thorax, legs, and first abdominal segment black; of rest of abdomen bright red; scopa red, black at extreme base; wings strongly smoky. Length 21 mm. or a little more.

Halictus hotoni, Vachal. (♀).

Chiyaka, Benguella, September 1st, 1907; at flowers of *Geigeria* sp. (F. C. Wellman). Previously known from a single female from Delagoa Bay. The specimen agrees with Vachal's description, except that the anterior tibiae have a suffused dark patch. The general appearance is just like that of *H. aureolus*, Perez, but the arrangement of the hair on the abdomen is different.

Halictus geigeriae, sp. nov.

♀. Between 6 and $6\frac{1}{2}$ mm. long; black; with short greyish-white hair; head rather large, dull, and finely roughened; clypeus produced; flagellum short, only faintly brownish beneath; mesothorax dull, with close minute punctures, except on each side of the middle, where they are sparse, though the surface still remains dull

the middle line of the mesothorax is quite strongly sulcate, and the punctures are dense along this depression; sides of thorax with rather copious white hair; tegulae black or very nearly so; area of metathorax well defined, minutely but very strongly cancellate; scutellum obtusely bigibbous; heart-shaped posterior face of metathorax with sharp borders; legs black, with coarse white hair; last tarsal joint rufous; hind spur of hind tibia serrate, the teeth evident; wings dusky hyaline, not yellowish; stigma and nervures piceous; third t. c. and second r. n. weakened; first r. n. joining second s. m. at its extreme apex, but not quite meeting the second t. c.; abdomen moderately shining, the punctures very minute; triangular patches of white pubescence at lateral bases of segments 2 to 4, very conspicuous; no apical bands, and the apical margins black like the rest.

Hab. Chiyaka, Benguella, September 1st, 1907; flying with *Ceratina geigeriae* at flowers of *Geigeria* sp. (F. C. Wellman).

General appearance like that of *H. opacus*, Perez, but *opacus* has the mesothorax shining, with very much larger and stronger punctures. *H. geigeriae* belongs to the group of *H. quadrinotatus* (Kirby) and *H. sexnotatus* (Kirby)—a group characteristic of the Northern Hemisphere.

University of Colorado, Boulder, Colorado:
November, 1907.

RECENT BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES ON THE RHYNCHOTA.

BY W. L. DISTANT.

MR. KIRKALDY (*ante*, p. 14), in reference to the genus *Platylomia*, Stål, writes:—"Distant says that this was not described by Stål, and was only a name in 1870. On the contrary, it was described by Stål (in the place cited by Distant), who doubtfully ascribed *flavida*, Guérin, as the type." The plain interpretation of such a statement is that I overlooked the description, and made an erroneous report thereon. So far from this being the case, I had previously (*Ann. Mag. Nat. Hist.* (7), xv. p. 65 (1905)) fully explained my reasons for considering Stål's short description as inadmissible, though retaining his name for the genus. Reference to this opinion is under the genus in my Catalogue, which Mr. Kirkaldy has ignored. I also referred as to the description of the genus to *Faun. B. I. Rhynch.* iii. p. 100 (1906), a book which Mr. Kirkaldy possessed, as he has elsewhere made several references thereto, and there I repeated the course I had pursued. The character given by Stål, "ramo venæ ulnaris interioris recto vel leviter curvato," was evidently taken from Guérin's figure, a character, as I stated, "given by the artist and not found in the species." Therefore, *flavida*, Guér.,

as thus described, could not be taken as the type, and I selected *spinosa*, Fabr., as available. Mr. Kirkaldy asserts that this "is invalid in any case, as Stål places it at the head of his sub-genus *Cosmopsaltria*." Of the latter genus Stål had (Berl. Ent. Zeitschr. x. p. 170 (1866)) previously fixed the type as *C. doryca*, Boisd., including in it both *spinosa*, Fabr., and *flavida*, Guér. These species cannot, however, be regarded as congeneric with Boisdual's *doryca*, and Mr. Kirkaldy's contention is untenable, while he has placed a forced interpretation on my sentence ("nom. nec descript.").

With the other opinions of Mr. Kirkaldy I am not concerned; I merely wish to correct his statements, and to desire accuracy in criticism.

A GUIDE TO THE STUDY OF BRITISH WATERBUGS (AQUATIC HEMIPTERA).

By G. W. KIRKALDY.

(Concluded from vol. xxxix. p. 157.)

I COMMENCED this "Guide" in August, 1898, in the thirty-first volume of the 'Entomologist,' and certainly never anticipated that ten years would pass before it was completed. This slowness has been due to causes beyond my control, primarily to my removal to the Hawaiian Islands, and secondly to a severe accident which has sadly delayed all my work; but I trust that the irregular appearance of these hints on the study of, perhaps, the most fascinating, morphologically and biologically, of all the Hemiptera—that is to say, of all animals—has not discouraged any of my readers who may have felt some inclination to study them.

I proposed to provide a list of all the British species, with their county distribution, but the publication, mostly since I left England, of the 'Victoria Natural History' series, none of the volumes of which I have seen, has compelled me to omit this part of my plan.

Later on I hope to revert to this subject, but I think that it is better to close the "Guide" at this point, hoping that the Editor will allow me to make further observations at some future time.

The following corrections should be made:—

Vol. xxxii. p. 296, line 1 of the table, read "First segment of middle tarsi not more than $2\frac{1}{2}$ times as long as the second," . . . and the corresponding entry, "First segment of middle tibiæ rarely (if ever) less than three times as long as the second segment."

Vol. xxxiii. p. 150, for "figs. 31-4" read "31, 32, 34"; for "figs. 35-9" read "35-6"; delete "40-."

ON THE VARIETIES OF *PYRRHOSOMA TENELLUM*
AND *P. NYMPHULA*.

BY KENNETH J. MORTON, F.E.S.

As is well known, the female of *Pyrrhosoma tenellum*, De Villers, assumes two strongly marked deviations from the normal form, namely, one which has the abdomen black-bronze, and the other which has the abdomen crimson like that of the male. Mr. Lucas (Entom. 1901, p. 68) names these forms *æneatum* and *rubratum* respectively. He remarks that Dale took the former in Dorset, and he mentions De Selys' references in the 'Revue,' p. 181, to both forms. De Selys there gave no names. Subsequently, however, in the 'Synopsis des Agrionines,' 5me legion: Agrion, pp. 185-6 (separate), the bronzed female is named *melanogastrum* (from Dorset, Syracuse, and Algeria), while the crimson female is named *erythrogastrum*. The intermediate form to which Mr. Lucas also alludes is called by De Selys *intermedium*.

And so, too, with *Pyrrhosoma nymphula*, Sulzer. The dark form (*æneatum*, Lucas) with yellow instead of crimson markings is named by De Selys (*l.c.* p. 188) *melanotum*, the localities stated being Madrid, Dorset, and Corfu. I possess it from the Sierra Albarracin, Spain (Miss Fountaine).

The Selysian names must naturally have priority.

13, Blackford Road, Edinburgh: January, 1908.

A NEW *PSEUDAGENIA* FROM SIKKIM.

BY P. CAMERON.

Pseudagenia bidens, sp. nov.

Black; pruinose, wings hyaline, a cloud along the transverse median and transverse basal nervures, the cloud narrow in front, becoming gradually widened behind; a wider cloud commencing shortly behind the first transverse cubital nervure and extending to the second recurrent nervure; the nervures and stigma black. Apex of clypeus rounded, its middle with two distinctly separated, stout teeth, bluntly rounded at the apex. ♀. Length, 9 mm.

Eyes converging above; the ocelli in a triangle, the hinder separated from each other by a less distance than they are from the eyes. Apex of mandibles brown; the palpi black, tinged with fuscous and covered with white pubescence. Thorax long; the apex of pronotum broadly rounded. Post-scutellum finely, irregularly striated in the middle. Apical slope of metanotum with a shallow finely irregularly striated furrow down the middle. The upper part of metapleuræ is separated from the lower by a distinct furrow, which has a few

strisæ. The long spur of the hind tibiæ reaches to the middle of the metatarsus; there is a distinct tooth on the base of the claw. The first transverse cubital nervure is broadly roundly sloped; the third has the front half obliquely sloped towards the stigma.

Belongs to Bingham's Section E, *a, ù*. Characteristic are the two distinct teeth on the apex of the clypeus.

NOTES AND OBSERVATIONS.

THE ENTOMOLOGICAL CLUB.—A meeting was held on January 14th, 1908, at the Entomological Salon of the Holborn Restaurant, Mr. G. H. Verrall in the chair. Other members present were Mr. R. Adkin and Mr. H. St. John Donisthorpe. Between half-past six o'clock and 8.30 p.m., when supper was served, over seventy guests had assembled. In his speech after the repast Mr. Verrall made sympathetic reference to the death of Mr. A. J. Chitty (a member of the Club), and of Mr. M. Jacoby, who had on so many meetings of the Club in that room contributed to the harmony of the evening by his brilliant performance on the violin. The Honorary Secretary submitted a list of the names of past and present members of the Club, dating from its foundation by George Samouelle in 1826; this showed a total of fifty during the eighty-two years. In addition to the membership roll a set of forms had been prepared, which, when filled up with the requisite particulars of their respective entomological careers and achievements, would furnish material for a biographical sketch of each member. Such records would then be inscribed in an elaborately bound and suitably ruled volume presented to the Club by Mr. Robert Adkin on Jan. 22nd, 1907. Mr. Henry Rowland-Brown and Mr. Alfred Sich were elected honorary members of the Club.

SYMPETRUM VULGATUM.—Some doubt has been raised as to the Hull specimen of this rare British dragonfly in the "Dale" collection, now located in the Hope Department of the Natural History Museum in Oxford. I have lately examined the cabinet containing the dragonflies and find a female specimen with a label, apparently in J. C. Dale's handwriting, stating that it came "from Mr. Harrison of Hull, 1837." There are also three other specimens—two males and a female—but these bear neither date nor locality.—W. J. LUCAS; Kingston-on-Thames.

SURINAM COCKROACHES AT KEW.—Of late years *Leucophaea surinamensis* has been noticed on one or two occasions in England. Apparently it has taken up its abode and intends to stay in Kew Gardens. "Handsome is as handsome does," I suppose; but, much as the authorities there would prefer its room to its presence, it is, nevertheless, an interesting little "beast," of very elegant proportions, and will not disgrace the orthopterist's cabinet.—W. J. LUCAS; Kingston-on-Thames.

PIERIS. BRASSICÆ LARVÆ IN JANUARY.—On January 4th, at Rayleigh, Essex, I found three larvæ of *Pieris brassicæ*, which had

apparently just crawled up a timber-built building for pupation: two had already begun spinning themselves up. The temperature at the time (midday) was cold but sunny; the thermometer registered four degrees of frost; since the 1st it had continued freezing. It is remarkable for these larvæ to survive for three months, as must have been the case; undoubtedly the eggs were deposited in September, 1907, and most likely early in that month, which would extend their larval duration to nearly four months, and to find them full-fed in January during frost is, I should imagine, unprecedented. They have since pupated: one on the 10th, the remaining two on the 11th and 14th, the transformation, as will be seen, occupying several days. F. W. FROHAWK.

NOTES ON *EUPITHECIA TOGATA*.—Last autumn I fixed a day for collecting larvæ of this fine "pug." Owing to the backward season I made the date a few days later than usual. It is advisable to obtain the larvæ full-grown, as there is then greater certainty that they will pupate successfully, and one may chance to find a few of the larvæ spun up in the cones. When I arrived at the district and had a look round, very few new cones were to be seen; but after further search I found a tree which bore many of the desired cones. They were situated near the top of the tree, and rather difficult to get at. I am a fairly good climber, however, and up the tree I went. To my delight every cone was infested with the larvæ; in fact, some of the cones had three or four larvæ in them. Never before had I observed so many larvæ in a single cone. It appeared to me all the female *E. togata* in the district had visited this tree to deposit their ova on the new cones. *E. togata* is not always to be found where spruce fir grows, even although the trees may bear numerous cones. The moths do not always emerge the following June, a good number of them lying over till the second year. The perfect insect is seldom seen on the wing, and is difficult to find on tree-trunks. From 1899 to 1904, although constantly on the look-out, I failed to see any cones which bore traces of the larvæ; I began to think the cold, wet seasons had swept them completely away. If June proves warm and there is then a fair amount of sunshine, the chance of larvæ of this species in the autumn is good.—R. LAWSON; Croft Park, Craigie, Perth, N.B.

MACROTHYLACIA RUBI IN WINTER.—On the 13th January, 1908, I took some hibernating larvæ of *M. rubi* from a turf in the open on which I had been keeping them (eighteen in all). They were then frozen so much that they could be snapped in pieces like pieces of stick; I then put them in a greenhouse about twelve o'clock; by three o'clock they had thawed and were beginning to move about, and on the following Wednesday the greater number had begun to spin cocoons. All except five have now spun up, and these five have produced pupæ of some parasite.—FRANCIS C. WOODBRIDGE; Northcroft, Uxbridge, January 22nd, 1908.

NEW AND COMPLETELY ILLUSTRATED WORK ON THE LARVÆ AND PUPÆ OF THE BRITISH MACRO-LEPIDOPTERA. — May I earnestly solicit the help of entomologists for this work. Loans or gifts of

larvæ or pupæ would be greatly valued, and I should have much pleasure in forwarding a list of my requirements to anyone willing to help. Many eminent workers have given, and are still giving, valuable assistance. Drawings and descriptions of the larvæ and pupæ of three-fifths of the species are completed; forty-five species are partly completed, and at least fifty of the rarer species, or occasional immigrants, will require to be drawn from continental larvæ and pupæ.—W. A. ROLLASON; Lamorna, Truro, Cornwall, January 20th, 1908.

ADDENDUM.—Page 24, last line add T. A. C.

CAPTURES AND FIELD REPORTS.

AGRÔTIS LUNIGERA AND LUCERNA IN SUSSEX.—Mr. Sharp, of Eastbourne, while collecting Noctuæ at sugar, upon the coast not far from Seaford, captured specimens of both these species, but only in small numbers. On a subsequent occasion I accompanied him to the locality and we then obtained *obelisca*, in addition to the above-named. I think this very interesting, for, as far as I can find, this is the first record of either *A. lunigera* or *A. lucerna* for Sussex.—A. J. C. WIGHTMAN; Ailsa Craig, Lewes.

L. VITELLINA IN SUSSEX.—While collecting at ivybloom in the Lewes district on October 19th, I had the good fortune to take a male specimen of *L. vitellina* which, however, was rather worn. My friend Mr. Sharp, of Eastbourne, also took a female specimen in the neighbourhood of Polegate about a week previously; his specimen was also somewhat worn.—A. J. C. WIGHTMAN; Ailsa Craig, Lewes.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—The Annual Meeting of this Society was held on Wednesday, *January* 15th, at their rooms in Chandos Street, Cavendish Square, Mr. C. O. Waterhouse, President, in the chair, when the following Fellows were elected as officers and to serve on the Council for the session 1908-9:—President, Mr. C. O. Waterhouse; Treasurer, Mr. A. H. Jones; Secretaries, Mr. H. Rowland-Brown, M.A., and Commander J. J. Walker, M.A., R.N., F.L.S.; Librarian, Mr. G. C. Champion, F.Z.S.; other members of the Council, Dr. T. A. Chapman, M.D., F.Z.S., Mr. A. Harrison, F.L.S., F.C.S., Mr. W. J. Kaye, F.L.S., Dr. G. B. Longstaff, M.D., Mr. H. Main, B. Sc., Mr. G. A. K. Marshall, Prof. R. Meldola, F.R.S., F.C.S., Prof. L. C. Miall, F.R.S., Prof. E. B. Poulton, D.Sc., M.A., F.R.S., Mr. R. Shelford, M.A., C.M.Z.S., Mr. G. H. Verrall.—The Report for the session 1907-8 showed that the Society had increased considerably, and that the number of Ordinary Fellows exceeded that of any previous year in the Society's history since its

foundation in 1833. The President then read his address, which dealt chiefly with the present unsatisfactory state of nomenclature in entomological science. He also advocated the establishment of a central "type" museum, on the lines of an experimental collection now formed at South Kensington, for the purpose of loaning specimens to institutions, whereby it was suggested that the existing confusion might be avoided, and the general work of identification made easier.—Mr. F. Merrifield proposed a vote of thanks to the President for his address, and Professor R. Meldola proposed a similar vote for the Officers of the Society, to which the President, the Treasurer, and the Secretaries replied.—H. ROWLAND-BROWN, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Thursday, December 12th, 1907*.—Mr. R. Adkin, F.E.S., President, in the chair.—Mr. H. W. Andrews, F.E.S., of Welling, was elected a member.—Mr. Newman exhibited (1) a large number of pupæ of *Pieris napi* spun up on the top of the cage, showing a large range of colour variation; (2) an example of *Ennomos autumnaria* devoid of speckled markings and with red tips of wings; (3) a very dark *Melitæa athalia* from Devon; and (4) examples of *Drepana harpagula* and *Trigonophora flammea* taken some years ago.—Mr. Tonge, a number of stereographs of entomological subjects, which were exhibited in the stereoscope kindly presented to the Society by Mr. Fremlin.—Mr. Kaye, a series of *Acidalia humiliata* from the Isle of Wight, and noted that they were smaller and less strongly coloured than continental specimens.—Mr. South, a bred series of *Eupithecia castigata*, showing none of the brown suffusion usual in captured specimens.—Mr. Adkin, a series of *Teras contaminata* from Polegate, and pointed out the extreme variation shown in the short series.—The following members exhibited selected specimens, series, and broods of *Pieris napi* and its various forms from English, Scotch, Irish, and continental localities: Messrs. Harrison, Main, Montgomery, Rayward, Newman, Joy, Turner, Grosvenor, Garrett, Sich, Adkin, Dr. Chapman, and Dr. Hodgson.—Mr. Main then read a short paper, "Some Notes on *Pieris napi*," and a considerable discussion ensued.—HY. J. TURNER, *Hon. Report. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Annual Meeting held at the Royal Institution, Liverpool, on *December 16th, 1907*.—Mr. Wm. Mansbridge, Vice-President, in the chair.—The following members were elected officers of the Society for the ensuing year, *viz.*—President, Samuel J. Capper, F.E.S.; Vice-Presidents, Prof. E. B. Poulton, F.R.S. (Oxford), J. R. Charnley, F.Z.S., II. H. Corbett, M.R.C.S. (Doncaster), Wm. Mansbridge, F.E.S., Eustace R. Bankes, M.A., F.E.S. (Corfe Castle), Robert Newstead, A.L.S.; Hon. Treasurer, J. Cotton, M.R.C.S., F.E.S.; Hon. Secretaries, H. R. Sweeting, M.A., Wm. Mansbridge; Hon. Editor, J. R. le B. Tomlin, M.A., F.E.S.; Hon. Librarian, F. N. Pierce, F.E.S.; Council, the Rev. T. B. Eddrup, M.A. (Wakefield), C. E. Stott, Robert Tait, Jr., P. Edwards, M.R.C.S., J. Collins (Oxford), R. Wilding, O. Whittaker, Wm. Bell, J.P., M.R.C.S., E. G. Bayford (Barnsley), P. F. Tinne,

M.A., W. D. Harrison, and W. A. Tyerman.—The Vice-Presidential address was then delivered by Dr. J. Harold Bailey, of Port Erin, Isle of Man, and was entitled "The Coleoptera of the Isle of Man." Dr. Bailey dealt with his subject in a most illuminating and scientific manner; he described the climate and topography of the island exhaustively, showing the influence of the ocean currents and prevailing winds upon the flora and fauna. The geological structure of the island was also considered, so far as related to the beetles and their distribution in this interesting area. Dr. Bailey discussed the probable date when there must have existed a land connection between the coast of Ireland on the west and that of Lancashire on the east, as evidenced by the numbers of various classes of Coleoptera and plants belonging to different periods of migration. Lengthy comparisons were made in this connection between the numbers and species of the different migrations, as now existing on the adjacent coasts, as well as in the case of the Alpine forms found on the Manx mountains and in the highlands of Scotland and Ireland. As this paper will be bound up with the new list of the Coleoptera of Lancashire and Cheshire shortly to be published by the Society, it is hoped that it will be read by all students of the distribution of insects. A vote of thanks to Dr. Bailey having been proposed and suitably replied to, the following exhibitions were made, *viz.*—Mr. C. B. Williams, a fine female example of the olive-banded form of *Bombyx quercus*, bred, 1907, from a Wallasey larva; Mr. Robert Newstead, a case showing the complete life-history of the common house-fly, which he had worked out, in his usual painstaking and thorough manner, during the past summer; Mr. J. J. Richardson, about seventy species of Lepidoptera taken from the lamps round Sefton Park, Liverpool, during 1907. These included a variety of *Halio vauaria*, *Noctua rubi*, *Plusiaiota*, *P. pulchra*, *Epione apiciaria*, *Eryonia ulniaria*, *Himera pennaria*, *Leucoma salicis*, and *Cymatophora duplaris*.—H. R. SWEETING and Wm. MANSBRIDGE, *Hon. Secs.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—November 18th, 1907.—Mr. G. T. Bethune-Baker, President, in the chair.—Mr. Leslie Frederick Burt, Edgbaston, was elected a member.—Mr. J. T. Fountain exhibited a long and variable series of *Apamea testacea*, Hb.—Mr. H. W. Ellis showed various Coleoptera: *Lathrobium lœvipenne*, Heer, a species not long known as British, of which he found six specimens in the Blatch collection from Knowle, Bewdley, and Cannock; and he had also taken it at Knowle; *Agabus affinis*, Pk., from Sutton. He said that he had previously also recorded *A. unguicularis*, Thoms., from thence, but that on sending the specimens to Mr. Balfour Brown they all proved to be *affinis*; *Dermestes vulpinus*, F., from Fareham, where the larvæ were eating the wooden beams in a manure factory.—Mr. G. T. Bethune-Baker showed butterflies of the genus *Epinephele*, chiefly from Turkestan.—Mr. Hubert Langley, *Lobophora carpinata*, Bkh., from Princethorpe Wood, and said that he had also taken *L. halterata*, Hufn. there.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—November 19th 1907.—Rev. C. R. N. Burrows exhibited *Camptogramma fluviata*

male, taken at sugar at Mucking, October 2nd, 1907. - Mr. A. Harrison, *Zygena minos*, Carnarvon, 1905 and 1907. The 1907 specimens were smaller and more thinly scaled than those taken in 1905, difference possibly due to the inclement season in 1907. Mr. G. G. C. Hodgson, *Zygena trifoli*, Sussex, early July, 1907, including six spotted specimens and three extreme examples of melanism with black hind wings and only a trace of the spots on fore wings. - Mr. L. W. Newman, a dark brown, almost black, specimen of *Oporabia dilutata*, Bexley, October, 1907. - Mr. A. J. Willsdon, a gynandrous *Crocallis elingaria* from Manor Park; also specimens taken in 1907 in this district, being heavily specked with brown, and altogether much darker than a specimen taken in the same district twenty-five years ago. Another example from Torquay showed a very dark central band and strongly marked marginal spots.

December 3rd. - Mr. J. A. Clark exhibited *Vanessa antiope*, Walthamstow, 1872. - Dr. G. G. C. Hodgson, *Hesperia comma*, from Surrey, including a male with cream ground colour and another male with under side as dark as in normal female. - Mr. L. W. Newman, three cocoons of *Dicranura bicuspis*, containing living pupæ, found on birch-trunks in Tilgate Forest. - Mr. J. Riches, on behalf of Mr. Dewey, of Eastbourne, very dark specimens of *Eprinda lutulenta* and *Scopelosoma satellitia*, and a uniformly brick-red example of the latter species. - Mr. I. A. E. Sabine, *Oporabia autumnata*, from Tilgate Forest, including a pale grey specimen with slightly darker broad central band on fore wings. - Mr. A. J. Willsdon, dark *Agrotis puta*, from Torquay. The following gentlemen were elected as Council for 1908: President, Mr. A. W. Mera; Vice-Presidents, Dr. T. A. Chapman and Messrs. J. A. Clark, F. J. Hanbury and L. B. Prout; Treasurer, Mr. P. H. Tautz; Librarians, Messrs. G. H. Heath and V. E. Shaw; Curators, Messrs. G. G. C. Hodgson and A. J. Willsdon; Secretaries, Messrs. S. J. Boll and T. H. L. Grosvenor; Non-official members, Rev. C. R. N. Burrows and Messrs. H. M. Edelston, E. Harris, J. Riches, and A. Sich.

December 17th. - Dr. T. A. Chapman exhibited *Vanessa urticae* from North Lapland larvæ; the specimens were slightly smaller, darker, and brighter than normal British *V. urticae*, and the brood included some examples of *ab. polaris* said to be common in those latitudes. - Mr. E. A. Cockayne, various Lepidoptera from East Aberdeen, 1907, including very dark *Xylophasia polyodon* and *Noctua xanthographa*, a red form of *Noctua neglecta*, dingy yellow-brown *Crocallis elingaria*, and a single *Agriopsis aprilina* with usual bright green ground colour replaced by pale grey-green. - Mr. E. Harris, fine male and female *Augosoma centaurus* from Gold Coast. - Dr. G. G. C. Hodgson, *V. urticae*, from Aberdeen, with a slight trace of a third spot above the two usual central black spots on fore wings; also a specimen from Surrey with these spots almost obsolete. - Mr. L. W. Newman, for Mr. G. B. Oliver, *Zygena minos* and *Z. filipendule*, from North Argyle, and a six-spotted *Zygena* with fluffy body, from the same district, suggesting that the two species hybridize there. - Dr. H. C. Phillips, a specimen of *V. urticae* with pale yellowish ground colour, from Birchington. - Mr. V. E. Shaw, *V. urticae ab. atrebatensis* (Bdv.), Bexley, August, 1905; also, from same district,

specimens of *V. urticae* with upper and two central spots on fore wings almost obsolete, and the lower much smaller than usual.—S. J. BELL, *Hon. Sec.*

RECENT LITERATURE.

Accouplement des Œufs, et Amour Maternel des Forficulides. By H. GATEAU DE KERVILLE. Pp. 31. Three figures in text. Rouen. 1907.

IN this most interesting paper the author has collected published information, and added observations of his own, concerning three points in the life-story of the Earwigs. The last and most interesting, first noticed by De Geer (1773), is the one to which most space is given. A large field, however, is still open to entomologists in this connection, for but nine species have thus far come under observation. These are:—1. *Forficula auricularia*, L. 2. *F. lesnei*, Fin. 3. *Chelidura aptera*, Charp. 4. *C. pyrenaica*, Gén. 5. *Anachura bipunctata*, F. 6. *Anisolabis maritima*, Gén. 7. *A. mauritanica*, H. Luc. 8. *A. littorea*, White. 9. *Labidura riparia*, Pall. Of these, 1, 2, and 9 are British species, while 6 has been taken casually in this country.

W. J. L.

The Annals of Scottish Natural History. Edinburgh. 1907.

ONCE more the editors have provided us with an interesting volume, and although again it is mainly concerned with things non-entomological, still there are a number of articles which it will be necessary for entomologists to consult. W. Evans has notes on "Tabanidæ at Aberfoyle"; "*Præmachelis hibernica* in Scotland"; "Some *Pezomachi* and other *Cryptinæ* from Forth"; "A New Louse (*Hæmatopinus ovillus*) from the Sheep," with a figure; and "*Gryllus domesticus* in an old quarry near Edinburgh." P. H. Grimshaw treats of "*Chærocampa celerio* at Galashiels"; "*Hydrotæa borussica*," a fly new to the British list; and "The Diptera of St. Kilda." P. Cameron has articles on "Scottish species of *Oxyura* (Proctotrypidæ)," "Scottish *Cryptinæ* (Ichneumonidæ)," and "Nocturnal and Alpine Hymenoptera." In addition we find "Lepidoptera from West Ross-shire, &c.," by D. Jackson; "*Sirex gigas* in South-West Scotland," by H. Maxwell; "Some Lepidoptera from St. Kilda," by C. G. Hewitt; and "A Note on *Eristalis tenuis*," by R. D. R. Troup.

W. J. L.

The Little Naturalist in the Country (The "Little Naturalist" Series). By Rev. THEODORE WOOD, F.E.S. London: Ernest Nister. 1907.

AT once the dainty appearance of this little book creates a favourable impression, which is enhanced as we look one by one at the numerous good illustrations, which appear to be quite original. The text describing four walks "across the fields, down the lane; through

the wood, and back along the banks of the stream"—one walk for each of the four seasons—is very suggestive to the budding naturalist. One little grumble we must be allowed—instead of “animals and birds and insects,” we feel bound to ask for “birds, insects, and *other* animals,” especially as the book is intended for beginners. Everyone separates living things into two groups—animals and plants. If birds and insects are not animals, what are they?

W. J. L.

Preliminary Report on the Habits, Life-cycle and Breeding-places of the Common House-fly (Musca domestica), as Observed in the City of Liverpool. By R. NEWSTEAD, A.L.S., F.E.S. Liverpool. 1907.

We have here a report of more than ordinary importance, and it is unfortunate that copies can be obtained apparently only at the Town Clerk's Office in Liverpool. We have always looked upon the House-fly as a nuisance at the best; after reading this report, especially that part relating to its breeding-places, we scarcely like to think what it might become at its worst. Various means of reducing the numbers of the House-fly are suggested, and apparently it has one very effective enemy in the domestic fowl. The parasitic fungus, *Empusa musce*, that kills so many House-flies in the autumn, is not mentioned—perhaps no use can be made of it. Apparently there still appears to be not much known about the winter condition of this insect.

W. J. L.

OBITUARY.

HENRY GUARD KNAGGS, M.D.

HENRY GUARD KNAGGS, M.D., was born in High Street, Camden Town, on March 21st, 1832, and was educated at University College School. His father, a medical man himself, had him trained up in his own profession at University College Hospital, after which he married, and started in practice in Kentish Town, afterwards removing to Camden Town. As a young man he interested himself greatly in entomology, and formed one of the finest collections of British Lepidoptera in England. He also became a member of the Entomological Society of London. During the sixties, the numerous entomologists who then lived in the north of London constantly used to meet at his house, or to walk home in parties together after the meetings of the Entomological Society. Among them were H. W. Bates, F. Moore, H. Vaughan, E. W. Robinson, H. Jekel, W. F. Kirby, and others; and entomologists and botanists from other parts of England (of whom F. Bond and J. Boswell Syme may be especially mentioned) were occasionally to be met at his house.

The 'Entomologist's Monthly Magazine' was started in 1864 with a staff of five editors—T. Blackburn, H. G. Knaggs, M.D., R. McLachlan, F.L.S., E. C. Rye, and H. T. Stainton, F.L.S. Black-

burn's name disappeared from the title-page after the second volume; but no further alteration in the staff occurred till 1874, when Dr. Knaggs found it necessary, owing to the increasing requirements of his profession, to retire from the active pursuit of entomology, and to resign his post as editor of the magazine, although he outlived all the other founders. His most important published entomological work is his 'Lepidopterist's Guide,' which has gone through several editions, and originally appeared in the form of papers in the early volumes of the 'Entomologist's Monthly Magazine.' However, Dr. Knaggs still retained his interest in entomology, and continued to write occasional notes, the last of which appeared as recently as July, 1906. Dr. Knaggs was very fond of Folkestone, where several of his most important captures had been made, and he bought a house there as an occasional seaside residence; and on retiring from his practice in North London (in which he was succeeded by his son, Dr. H. Valentine Knaggs) he settled there for the remainder of his life. His death supervened on a long and painful illness on January 16th, 1908, and he was buried at Highgate Cemetery on January 20th. His widow, one son, and five daughters survive him. For some years Dr. Knaggs was a Fellow of the Linnean as well as the Entomological Society, but he had retired from both before his death.

W. F. KIRBY.

NICHOLAS FRANK DOBRÉE.

THE death of Mr. N. F. Dobrée, of Beverley, East Yorkshire, occurred on January 8th, 1908, at the age of seventy-seven. A native of Guernsey, and belonging to an ancient and distinguished family, Mr. Dobrée first came to Hull under the charge of Sir William Wright, and about 1850 started in business as a grain and seed merchant, his business offices being situate in the fine old Elizabethan house in High Street, Hull, which was the birthplace of William Wilberforce. There he remained till towards the close of 1906, when "Wilberforce House" was acquired by the Corporation for use as a museum of local antiquities.

Mr. Dobrée travelled largely on the Continent, and was a perfect linguist in German, French, Swedish, and Italian. On these travels he made the acquaintance of many of the leading continental entomologists, including Dr. Staudinger and Herr Louis Graeser. Mr. Dobrée's inclinations had always lain in the direction of natural history pursuits, and about 1871 his attention became directed to the wide field open for observation among the European Noctuæ. With his friend, the late Mr. George Norman, he therefore set about forming such a collection of this group of the lepidopterous fauna as would show the geographical distribution of the various forms. This he continued for many years, and the collection he formed became generally recognized as the best private collection of Noctuæ in this country.

As a keen student Mr. Dobrée gained a correspondingly wide knowledge of the group, and he was a frequent contributor to the pages of this Journal between the years 1875 and 1893, his most

valuable papers being those on "Melanism" and on "*Agrotis fennica*," appearing in two of the issues for 1887. These were epoch-making contributions, and Mr. J. W. Tutt, in his papers on Melanism published a few years later, spoke eulogistically of their author as "our greatest authority on continental Noctua."

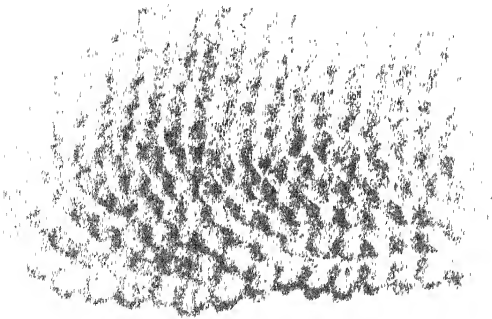
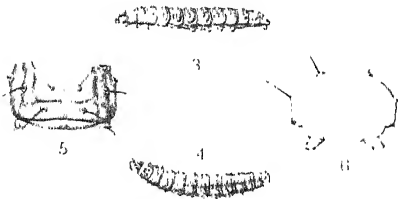
Mr. Dobrée also contributed largely to the local records published in the 'Naturalist' from 1881 to 1901, and was President of the Hull Field Naturalists' Society during the years 1884-86.

In 1904 Mr. Dobrée presented his collection of European Noctua to the Hull Museum. It consists of nearly one thousand geographical forms, and of more than six hundred examples of preserved larvae. In the preservation of larvae Mr. Dobrée was a pioneer, and by his universal kindness helped many other students to take an interest in this branch of knowledge. His collection has for some months been undergoing the process of cataloguing, and a fully descriptive catalogue will shortly be issued by the Museums Committee of the Hull Corporation, thus rendering the unique collection more widely known and more useful—it is hoped—to students in other parts of the country, as well as to those living in the remote corner of Holderness.

H. B. B.

ARTHUR JOHN CHITTY, who died on January 6th last, aged forty-eight years, was a barrister with a large practice as a company lawyer. During his University career at Oxford he on several occasions kept wicket for the University eleven, and played in the Association football team; he also rowed for his college eight, but failed to get in the trial eights. He obtained a first class in Classical Moderations and a second class in the Final School of Literaræ Humaniores. His entomological interest was chiefly centred in the Coleoptera, in the investigation of the habits of which he was especially successful. Other orders also received his attention, and recently he had commenced to study the Proctotrypidæ, a family of parasitic Hymenoptera, including some of the smallest winged insects. He was elected a Fellow of the Entomological Society of London in 1891, and had served on the Council since 1906. He was also a member of the Entomological Club, into which he was elected in 1904.

HENRY ALFRED AULD died on December 28th, 1907, at the age of fifty-three. He was for many years in the Bank of England. As a collector of Lepidoptera he was most persevering, and never spared himself any trouble in endeavouring to attain his object. Unfortunately he did not consider his field observations of sufficient interest to place on record, and consequently he rarely contributed anything to entomological literature. He was a member of the South London Entomological Society from 1888 to 1897.



THE ENTOMOLOGIST

VOL. XLl.]

MARCH, 1908.

[No. 538

EDITORIAL.

WE have very great pleasure in stating that Mr. HENRY ROWLAND-BROWN has most kindly consented to join the Reference Committee of this Journal. His interest in the 'Entomologist' has been shown in the past by frequent contributions to its pages, and in various other ways he has been exceedingly helpful to us. We feel assured that the able assistance he will give in the future, particularly in connection with European Rhopalocera, of which he has special knowledge, will be as highly appreciated by our readers as by ourselves.

LIFE-HISTORY OF *TORTRIX PRONUBANA*.

BY ROBERT ADKIN, F.E.S.

(PLATE II.)

FROM larvæ collected at Eastbourne during the last week in May two male and one female imagines of *Tortrix pronubana* were reared on the morning of June 28th. During the whole of that day they remained quiescent, probably on account of their being effectually screened from any little sunshine there may have been. In the evening one of the males was placed with the female on a freshly cut sprig of *Euonymus* enclosed in a glass cylinder, which was placed where it would receive the early morning sunshine. On looking at them later in the evening the moths were still resting apart, just in the positions where they had been placed; but on visiting them between seven and eight o'clock on the following morning they were found to be paired, and the female deposited ova the same evening.

The eggs are laid in batches after the usual *Tortrix* manner,

ENTOM.—MARCH, 1908.

E

one row overlapping another, very like the scales of a fish. They are deposited on the upper side of the leaves of the food-plant, and when quite fresh are brilliant green in colour, but gradually change to a dull greenish yellow, and finally to a dark purplish grey just before hatching, this last change in colour being caused by the black heads and dull yellowish bodies of the fully formed larvæ being seen through the parchment-like skins of the eggs. The larva within the egg is curled up horseshoe-wise, and when ready to come forth it repeatedly opens and shuts its mouth, pressing it the while against the egg-skin until it is pierced; it then seizes the fractured skin in its jaws and tears the hole large enough to admit of its head being forced through, and its escape is thus permitted.

On July 19th the first laid batch of eggs, being evidently on the point of hatching, was placed on a growing plant of *Euonymus japonicus* that had been potted up for the purpose, and an inspection later in the day showed that the larvæ had come forth and had disappeared; no trace of them whatever could be found. On the following day two other batches of eggs that had assumed the final colour were put into a breeding-cage on cut shoots of the food-plant, but with little better success, as when next looked at, young larvæ were seen to be swarming through even the smallest crevices and running away at a great pace, and the majority of this lot also was lost. Evidently the newly-hatched larvæ had a roaming instinct that had to be reckoned with. Only two very small batches of the eggs were now left, and these were put into a glass cylinder with freshly cut shoots of *Euonymus*, and so secured that escape was impossible; and within a few days it was found that the larvæ had emerged from the eggs, and settled themselves between the leaves to feed.

The larva on leaving the egg measures just under 2 mm. in length, is dirty yellow in colour, with numerous stiff whitish hairs disposed over its body, and has a shining jet-black head. It is exceedingly active, travelling rapidly, and for a long distance before settling down to feed. This wandering propensity, which I assume is common to the majority of the Tortricæ, appears to be a necessary habit. The eggs are laid in masses, but the larvæ are solitary feeders, more than one seldom being found on the same shoot of the food-plant. A rapid dispersal over a considerable area, in order that they may find suitable positions in which to commence their isolated existence, is therefore essential to their well being, and this, the power they possess of rapid and sustained movement immediately after leaving the egg, enables them to effect. So soon as a larva finds a suitable position, such as two leaves in close proximity, it spins a few threads of silk between them, thus securing itself, and commences to feed. One of the larvæ that I had in the glass cylinder very obligingly fixed itself up between the back of a leaf of the

food-plant and the glass, and was thus under observation during the first two or three weeks of its existence; it fed upon the fleshy part of the back of the leaf, but did not penetrate to the front. The first moult took place on August 7th, when the larva became a yellowish-green colour, the head assumed a browner appearance, and the length had increased to $4\frac{1}{2}$ mm. By the 18th it had moulted again, measured 7 mm. in length, and had become pale green in colour, the head still maintaining the brownish appearance.

Soon after this it became necessary to change the food, and as the larvæ all spun themselves in between leaves it was impossible to keep so close a watch upon them as formerly, but on turning them out some two to three weeks later it was found that they varied very considerably both in size and colour, some two or three being in their last skins, while a larger number appeared to be about half-grown, and the chief difference noticeable in them since their second moult was that the colour of their bodies had become a more decided green.

The full-fed larva measures 15 mm. to 20 mm. in length. The head is smaller than the second segment, glabrous, horn-colour, and has two or more dark brown or black patches at its base, and sundry dark brown or black markings about the mouth-parts; the intensity and number of these dark markings varying in individuals. The thoracic plate is glabrous green, with four (more or less) blackish-brown, irregularly angulated patches along its posterior margin. The body tapers towards each end, is olive-green on the back to the lateral skin-fold, which, as well as the ventral surface, is paler; the anal segment also is paler. On the back of each segment are four slightly raised paler tubercles and below them on each side another, each emitting a stiff whitish bristle, and on the skin-fold is yet another, from which two bristles spring, the whole giving the larva a somewhat hairy appearance.

The first moth emerged on September 18th, and was followed by others at somewhat lengthy intervals until December 13th, this last having been in pupa for some five or six weeks, during the latter part of which it was kept in a cool greenhouse to protect it from any actual frost. The remainder of the larvæ are hibernating (?), approximately full-fed, and as those from the September-October moths pass the winter quite small, there appears to be good reason for supposing that the imagines are on the wing throughout the summer and autumn months.

EXPLANATION OF PLATE II.—1. *Tortrix pronubana*, ♂. 2. Ditto, ♀. 3. Larva, dorsal view, slightly enlarged. 4. Larva, lateral view, slightly enlarged. 5. Segment of larva, enlarged, dorsal view. 6. Enlarged sectional view of larva. 7. Mass of ova $\times 100$.

SUPPLEMENTAL NOTES ON *EUPITHECIA*.

BY LOUIS B. PROUT, F.E.S.

I do not propose, on the present occasion, to enter upon a discussion of any fresh questions, but merely to make some additions which have been placed at my disposal by some kind correspondents, at the same time thanking all those who have been good enough to intimate their appreciation of my previous articles (Entom. xl. 169, 206, 220), and expressing anew the hope that an increasing number of workers will devote themselves to the study of the genus.

I exceedingly regret that two inexcusable blunders found their way into my introduction, which was prepared in a somewhat more hasty and perfunctory way than the rest of the notes, the fact being that I was rather tired of the warfare against "*Tephroclystia*," yet felt that I must not miss so good an opportunity for a final onslaught. Of course, on p. 169, second paragraph, I ought to have written *Tephroclystia*, not *Tephroclystis*, the former being Hübner's spelling, the latter Meyrick's (copied by Hulst), and due merely to an inadvertence, probably originating in the instinct to make the name "homœoteleutan" with *Chloroclystis*, Hb. In the same paragraph I wrote, by a *lapsus memoriæ*, "*Eupithecia* (with type *linariata*)"; whereas, as I perfectly well knew, Curtis chose *absinthiata*, Cl., as the type of his genus, though he figured, and drew his structural details from, *linariata*. The eagle eye of my valued friend and co-worker, Rev. G. W. Taylor, at once detected these errors, he having had correspondence with me earlier on the self-same points.

Regarding the *Phyteuma* larvæ of *Eupithecia denotata* = *campanulata*, mentioned on p. 209 (middle paragraphs), Dr. Draudt writes me that the imagines obtained from them show no difference from other *denotata* bred from *Campanula*.

I learn from Mr. Eustace R. Banks that he has already interested himself in the curious record of *E. fracinata* larvæ on "scabious" at Hartlepool (*vide* p. 208), and he has kindly given me free permission to use the correspondence which he had with Messrs. Robson and Gardner on the subject. Barrett's record, as Mr. Banks points out, is based on a fuller one in Robson's "Catalogue of the Lepidoptera of Northumberland, Durham, and Newcastle-upon-Tyne" (Nat. Hist. Trans. North., Durh., x. 1902), which reads as follows (p. 267) :—

"In August, 1899, I took some 'pug' larvæ on the sandbanks between Black Hall Rocks and Castle Eden, which produced three melanic imagines, for which the same name" [*innotata*] "is suggested. I made no notes of the larva, thinking them some common species, and writing now from memory I

think they more resembled *fraxinata* than *innotata*. They were feeding on scabious, and I do not remember any *Artemisia* near, but certainly there was no ash. Up to the present time I believe *innotata* has only been found on *Artemisia*. Mr. Gardner says, 'I find all the "pugs" I have bred will feed upon the flowers of plants, particularly of scabious and *Centaurea*.'" On inquiry, Mr. Bankes learned that there was much that was hazy concerning this record. In the first place, Mr. Robson acknowledged (*in litt.*, 20th April, 1904) that the plant referred to as a "scabious" seemed to be really a knapweed, probably *Centaurea uigra*, his botanical knowledge having "rusted for some forty years"; Mr. Gardner, on the contrary, who was with Mr. Robson when the larvæ were taken, asserts positively (*in litt.*, 13th June, 1904) that they were found "*on various plants*." Further, there was a discrepancy as to the exact number found, each being "fully persuaded in his own mind"; the exact details, as furnished by each, are not relevant to the present question. Both, however, were in the main agreed that the larvæ agreed rather with Buckler's figures of *E. fraxinata* than of *E. innotata*; for Mr. Gardner wrote much more definitely than Mr. Robson, his words being: "I can assure you that the larvæ we got were the gaily coloured larvæ of *fraxinata*, and not that of the miserable-looking example figured for *innotata*." But I have shown (*Entom.* xi. 206-8; *Ent. Rec.* xvi. 336 *) that *E. innotata* is far more variable in markings and habits (even apart from the *fraxinata* race) than Mr. Gardner was aware, and this of course weakens his evidence. Mr. Bankes, who very carefully examined the disputed specimens, inclined to call them *innotata*, but he confesses that (like all the rest of us!) he "cannot separate the moths with any certainty."

The above shows that no such definiteness exists about the "scabious" record for "*fraxinata*" as I assumed when I wrote; but I fear it proves little or nothing else. I hope our northern friends will work their coasts thoroughly and systematically for "pug" larvæ, and clear up some of our dark places.

As to the "*E. tamarisciata*" (?) bred by Mr. E. M. Holmes, F.L.S., from North Cornwall (*Ent. Rec.* xviii. 158), Mr. Holmes tells me he was unaware that Mr. Tutt intended to publish a reference to it, and it was perhaps a little premature, as Mr. Tutt had not seen the larvæ, and evidently only determined the species by the food-plant. Mr. Holmes has very kindly submitted his material to my inspection, but as he will no doubt write upon it when further elucidation has been obtainable, I shall not forestall him further than to say that I quite agree with him that his larvæ did *not* tally with the only definitely

* "Mr. J. Gardner," in this latter reference, is a printer's or editor's error for "Mr. J. E. Gardner," and refers to Mr. Gardner, of Clapton, not to Mr. Gardner, of Hartlepool.

known form of *tamarisciata*, but much rather with *fraxinata*, and that for the present I would not venture to locate the imagines; of course they belong to this *group* (or *species*, if Staudinger is right).

Regarding the question of food-plants and larval habits of the "pugs," I have had further interesting notes from Mr. Percy C. Reid. He has discovered that in his district hawthorn—which I gave as a quite exceptional food-plant for the species (Entom. xl. 322)—is regularly favoured by the larvæ of *Chloroclystis coronata*, and that in both broods. Mr. Reid has made a partial reference to this in some recent notes on the season 1907 (Ent. Rec. xx. 13), but I think it worth while to quote from a letter which he sent me while my former papers were in the press. He writes (*in litt.*, 27th July, 1907): "In May last I bred some specimens of this insect" [*C. coronata*] "in a cage containing a number of pupæ, beaten as larvæ from hawthorn in the preceding August. As hawthorn is not mentioned as a food-plant in any work of reference in my possession, I concluded that by some accident these *coronata* had found their way as larvæ or pupæ into this cage, and thought no more of it. But in June last (on the 21st, I think *) I beat a number of Eupitheciid larvæ from hawthorn, and wondering what they could be I made a note of the fact. Now they are beginning to emerge as *E. coronata*." To this should be added—from the article in the 'Entomologists' Record' already alluded to—that these were succeeded by a further brood of larvæ at the end of August on bramble, one of which produced the imago on September 29th, a member of the very partial third brood which this species occasionally throws. I can also amplify, from the information he has supplied me in correspondence, Mr. Reid's note on the occurrence on *Pastinaca* of the larvæ of *Eupithecia pimpinellata* and *trisiinaria*. He writes (*in litt.*, 21st September, 1907): "It does not do to generalise from one observation, but I noticed that the *pimpinellata* occurred on the smaller and more scattered plants on the open down, while the *trisiinaria* were on the larger and more rampant plants along the edges of and just inside a copse.

I had hoped, ere now, to be in a position to say something about the differentiation, or otherwise, of *Eupithecia unnotata* and *fraxinata* by the genitalia, but the illness of my friend Mr. Pierce has hindered work in this direction, and if any definite result be arrived at, it must be published in a separate note.

* Mr. Reid has now fixed the exact date as June 20th.

A FEW NOTES FROM BÉRISAL DURING JUNE, 1907.

BY R. M. PRIDEAUX.

HAVING read Mr. Rowland-Brown's recent interesting article (Entom. vol. xl. pp. 241-248), it occurred to me that a few observations from the same district, made prior to his sojourn there, may be worth jotting down.

Mr. G. C. Griffiths and myself, after a short experience in the Lower Rhone Valley, arrived at Bérisal for an eleven days' stay on June 13th last. As elsewhere, the season was a decidedly backward one, and far too early at this period for the more essentially alpine species to put in an appearance. Nevertheless, we did not do badly, being able to secure many species freshly emerged, and also to find a considerable number of interesting larvæ and pupæ from the rocks and stones, &c., in the neighbourhood, a fair proportion of which were subsequently reared to maturity at home.

Mr. Rowland-Brown's tragic account of the condition of the locality for *Rusticus zephyrus* var. *lycidas* above Refuge II. emphasizes our good fortune in having had an earlier experience of it. Normally, it would appear that this species might first be looked for at the end of May, judging from its abundance this year by June 15th, on which date even a few slightly ragged specimens were to be seen. No doubt a very prolonged period of emergence enables this species to hold its own in a much hackneyed locality. Having on previous occasions obtained specimens of *R. lycidas*, I was content with boxing a few perfect ones. They are best obtained, in my opinion, on a dull, windless day, or towards sundown, by scanning the grassy downs and slopes where the food-plant occurs, when they may readily be discovered at rest. The females lay pretty freely in captivity on *Astragalus exocarpus*, but it is difficult to obtain a satisfactory root of this plant for transplantation, and a trial of the young larvæ on various other Leguminosæ, and also on *Erica* and *Calluna*, proved a failure. I possess one male of this species which exhibits a few of the silvery-blue scales on the eye-spots of the under side hind wings placed where they normally occur in the type *R. zephyrus*, also in *R. argus* and *R. argyrognomon*.

The latter two "blues," though later abounding in company with *lycidas*, had not emerged on June 15th, nor were seen there until several days later. *Polyommatus escheri* did not turn up until the 18th, when the males began to appear in superb condition. A pleasant surprise was the sight of *P. baton* between the Ganter Bridge and Refuge II., several specimens in fair condition turning up on and after the 17th. Another unexpectedly early visitor was a male *P. eros*, attracted by a puddle close to the Ganter Bridge, on the 18th, but not subsequently

seen again. Single specimens of *Lycæna arion* var. *obscura* were obtainable in rare perfection on and after June 18th. *Polyommatus hylas* first appeared in this district on June 21st (males only), though commonly met with at lower elevations—near Montreux, &c.—earlier in the month. The following additional “blues” were all more or less abundant round Bérissal during our stay:—*P. alexis*, *P. bellargus*, *P. astrarche* (with one ab. *allous*), *P. eumedon*, *Cupido minima* and *Nomiades semiargus*.

It was a pleasure to record the first male *Chrysophanus alciphron* var. *gordius* on June 20th. A small race of this species was abundant just below Bérissal in July last year, but specimens reared therefrom and emerging this season are but little below the average size of specimens taken near Vernayaz in 1905. The species hibernates invariably as a larva, never as an ovum, in my experience, and when once the young larvæ can be induced to recommence feeding in the spring there is little difficulty in bringing them to maturity.

Parnassius apollo was fairly common by June 17th about the road and cliffs towards Refuge II., and Mr. Griffiths and myself were both fortunate in finding one or two full-grown larvæ of the species. My own, taken on the bare ground on June 20th, spun up at once, and produced a male butterfly on August 11th. *P. mnemosyne* was already out on the steep slopes below the hotel on June 17th, and on every subsequent day in increasing numbers; also in the Steinenthal on June 20th. On this day, too, the first *Colias phicomone* were met with—three specimens—and Mr. Griffiths also obtained one much lower down, near Refuge II. *C. palæno* was neither expected nor seen up to the time of our leaving; *C. hyale* was generally common.

Papilio machaon was common from June 16th, especially round Refuge II. On the next day it was tantalizing to find three (presumably plum- or sloe-fed) *P. podalirius* feeding in puddles near the Ganter Bridge, while the writer found it needful to plod his way down to one of the outlying settlements near Brigue to obtain the plum-leaves required by a brood of *Zephyrus betulæ* larvæ previously obtained near Glion. On this same day *Aporia crategi* was flying, larvæ and pupæ of which were abundant on the mountain-ash trees round the hotel. *Leptosia sinapis* and *Euchloë cardamines* were common, with *Pieris napi* var. *bryoniæ* (females) in very fine condition. On June 15th, in one spot just above Bérissal, *Anthocharis simplonia* was so abundant that about twenty specimens were netted in as many minutes, and it continued common but far less local and easily obtainable during the remainder of our visit.

June 16th, a superb brilliant day, spent on the beautiful stretches of road up to the Hospice, convinced us that our better ground for the time being lay below rather than above Bérissal. Nevertheless, a fair number and variety of larvæ and pupæ from

the stones and rocks prevented the day from being (even entomologically) wasted.

Of the Argyniids, only *Brenthis euphrosyne* was abundant; one pupa, found on June 16th, produced a butterfly in ten days. Mr. Griffiths also found a pupa of *B. amathusia*. *Issoria lathonia* was pretty common near Refuge II., but not in very good condition. Among the Melitæids, *M. phæbe* was found in abundance as a larva and pupa, the first imago appearing on June 17th, and a female being bred in captivity as late as August 22nd. The cold summer in England seemed to have a very retarding effect on these and other larvæ, they ceasing altogether to feed during dull chilly weather, and always exposing themselves on their thistle-tops to such sunshine as was to be had. The commonest pupa of the genus above and below Bérisal was *M. dictynna*, the butterflies emerging in the following July. The pupæ hang, regardless of aspect, on perpendicular rocks and stones, frequently on such as afford no very obvious projection or irregularity for convenience of pupation. Many developed parasites, and some freshly turned examples were found being devoured by large ants. The butterfly was scarcely out before our departure on June 22nd, but I believe Mr. Griffiths secured one specimen. *M. parthenie* var. *varia*, also *M. athalia*, were met with, and *M. cinxia* had been out some time, judging from its condition. A few *M. aurelia* were taken near the Ganter Bridge, and a specimen bred from a stone-hung pupa on July 26th. Males of *M. didyma* were out in superb condition by June 18th, soon becoming commoner, and females were taken half-way down to Brigue on 17th and 22nd. One pupa was found which yielded a male imago on July 19th.

Rarely has one the pleasure of recording seven species of Vanessidæ on a single occasion, but on June 19th *Aglais urticæ* (fine and fresh), one *Eugonia polychloros* (also fresh), and hibernated examples of *Pyrameis atalanta* and *carlui*, *Euvanessa antiopa*, *Vanessa io*, and *Polygonia c-album* were all to be seen between Bérisal and Refuge II.

Species of the genus *Erebia* naturally were not out in full force during our stay. *E. cecias* was, however, abundant both above and below Bérisal, *E. ceto* began to appear on June 18th, and Mr. Griffiths netted the first *E. tyndarus* in the Ganterthal on the same day. *Pararge hiera* was abundant, especially above Bérisal, and *P. mæra* began to appear below on June 18th. A few larvæ were found on grass, and pupæ suspended from stones, of this species. *Cænonympha arcania* var. *darwiniana* was recorded first on June 19th.

The "skippers" were represented by *Hesperia carthami*, *H. alveus*, *H. serratula*, *H. malvæ* and *H. sao*, *Nisoniades tages*, and *Pamphila sylvanus*.

Several species of Noctuæ and Geometræ were found at rest

on the rocks, many of which still require naming. Amongst the latter were hibernated specimens of *Cidaria miata* and *Scotosia certata*; I netted a *Cymatophora duplaris*, and a specimen of *Cherocampa porcellus* was also taken at rest.

The above notes will, I think, show that an earlier visit than is customarily paid to this beautiful region by entomologists is by no means profitless; special points being the superb condition of most of such imagines as were recorded, and also the abundance of larval and pupal life, the list of which, had our weather proved less favourable for net-work, could no doubt have been largely extended.

Brasted Chart, near Sevenoaks: December, 1907.

ON THE INTERESTING NATURE OF HETEROPTEROUS METAMORPHOSES.

BY G. W. KIRKALDY.

THE statement in most entomological text-books that the Hemiptera undergo only a very slight metamorphosis throughout their postembryonic life, has probably led to the almost total neglect of this fascinating branch of entomology.

In a broad sense, as indicating their homomorphous nature, this is true, but as regarding actual details, it is very misleading. From ovum to adult many of the Hemiptera undergo very remarkable changes of form, much more interesting in reality than the ecdyses of Lepidoptera or other Heteromorpha; for while these latter have three well-marked post-oval stages, in the Hemiptera there is, as a rule, the gradual evolution of a single form.

Entomologists will open up almost virgin soil in a fascinating field who will rear up Hemiptera through all their stages, describe and draw these, record their food-plants and habits, &c. In the October number I briefly alluded to the Homoptera; now I offer a few words on the Heteroptera.

The Cimicidæ (= Pentatomidæ) are especially worthy of study. The eggs are among the most remarkable in form, sculpture, &c., of any insects, and are known in less than a dozen species all over the world.

De Geer ('Memoires,' vol. iii. pls. 13 and 14), 1773, has roughly figured some of the stages in *Dolycoris baccarum* (or *Cimex verbasci*, as he calls it). The eggs are laid on the flower-heads of avens, *Geum urbanum* (pl. 13, fs. 19-22, &c.). They are oval, with a little lid. The first nymphal instar has a short rounded head, forming almost one curve with the pronotum at the sides (pl. 14, fs. 1-2), but in a later stage the anterior

margin of the pronotum is straight and very wide, the head narrow (figs. 3-4).

Elasmucha grisea (= *Acanthosoma interstinctum*, Saunders = *Cimex betule* De Geer) is celebrated for its parental affection (cf. 'Entomologist,' 1903, p. 114). An early nymphal instar has a remarkably produced head, the central lobe being twice as long as the lateral ones. The species of *Eurydema* (*Strachia*) have strongly coloured, cylindric eggs, with truncate ends.

The nymphs of Tingidæ are usually curiously spined, while those of many Reduviids are sticky and so become covered with dust, pollen, cast skins of their prey, &c. The eggs of Reduviids are deposited, like those of Cimicids, on the surfaces of leaves, and have ornamented caps of noteworthy form. The eggs of Nabidæ are inserted in plant-tissue, almost to their very end.

Among specially interesting British Heteroptera, of which the life-histories are only partially, or not at all, known, I would suggest: *Eysarcoris fabricii* (= *melanocephalus*) on *Stachysylvatica*; *Rhytidolomia* (= *Pentatoma*) *juniperina* on *Juniperus communis*; *Eurydema oleracea* on Cruciferæ; *Elasmucha grisea* on *Betula alba*; and *Monanthia cardui* on *Carduus crispus*. These five are all common, at least locally, and should be easy to observe and rear up. I may perhaps be allowed to refer to two of my own papers which may be of interest in this connection, viz.:—"Upon Maternal Solicitude in Hemiptera, &c." Entom. 1903, pp. 113-20. "Biological Notes on the Hemiptera of the Hawaiian Isles. No. 1." P. Haw. E. S. i. 135-61; 4 text figs.

My friend Mr. de la Torre Bueno has recently described the stages of several waterbugs very fully in the 'Canadian Entomologist.'

NEW AMERICAN BEES.—VI.

By T. D. A. COCKERELL.

Osmia copelandica, sp. nov.

♀. Length 7 mm.; black, with a very faint brassy tint on the front, and the abdomen with an obscure purplish lustre, and the hind margins of the segments very narrowly ferruginous; *ventral scopa* pure white; conspicuous white hair at sides of face, sides of metathorax, and to a less degree about tubercles; first and second abdominal segments with conspicuous white marginal hair-bands, on the sides only; hair on inner side of hind tarsi white tinged with golden; head and thorax densely punctured; head large, cheeks broad; flagellum faintly reddish beneath; mandibles tridentate; clypeus prominent, rather produced, the lower margin gently concave; tegulæ dark reddish; wings a little infuscated; abdomen shining, finely punctured; spurs yellowish-ferruginous, not dark; pulvillus large. A very distinct species, apparently related to the European *O. adunca* (Panzer), but much smaller.

Hab. Copeland Park, Boulder County, Colorado. Sept. 4th, 1907 (S. A. Rohwer).

Epeolus hitei, sp. nov.

♀. Length $7\frac{1}{4}$ mm.; black, with the usual markings; head and thorax densely rugoso-punctate; head broad, eyes strongly converging below, labrum, mandibles, and first three antennal joints ferruginous; tegulae, tubercles, tibiae, tarsi and femora at apex and narrowly beneath, all lively ferruginous; anterior middle of mesothorax with a rather V-shaped mark of light pubescence; scutellum bigibbous, extending beyond the short lateral teeth; pleura with a very broad and conspicuous transverse band of light hair, below which it is nude or almost, very densely rugoso-punctate; spurs reddish-white; wings with a distinct dusky shade beyond the marginal cell; stigma ferruginous; abdomen with broad yellowish-white hair-bands; first segment with a long transverse dark area, and the marginal band interrupted in the middle. In Robertson's table (Canad. Entom. October, 1903) this runs to the neighbourhood of *E. autumnalis* Rob., but is very distinct from that by the markings of the thorax, larger punctures of scutellum, &c. The resemblance is closer to *E. beulahensis*, Ckll., but the thorax is much less hairy than in that species, and the lateral oval spots on second abdominal segment are wholly wanting, while the dark area on the first is not pure black, but is covered with fine golden-brown pubescence.

Hab. Copeland Park, Boulder County, Colorado. September 6th, 1907 (G. M. Hite).

Sphecodes lautipennis, sp. nov.

♂. Length 8 to 9 mm.; black, with the abdomen red except at base and apex; face covered with white hair; vertex with erect white hair; mandibles with the apical three-fifths ferruginous; antennae black, flagellum thick, submoniliform; thorax with white hair, the mesothorax quite hairy, and with strong close punctures, the posterior middle shining and with the punctures widely separated; middle of scutellum flattened, shining and sparsely punctured; area of metathorax sharp-edged, and with very strong vermiform plications; legs black, the small joints of tarsi ferruginous; tegulae testaceous, subhyaline and punctured in front; *wings ample, very clear*, almost milky, nervures very pale ferruginous, stigma more infuscated; abdomen parallel-sided but not especially narrow, shining; first segment very sparsely punctured, second with the apical two-thirds very sparsely punctured, the basal with fine close punctures; third with the fine punctures extending practically to the subapical groove; fifth and sixth segments, except apical margin of fifth, black, and a little blackish on the one before; black on first segment occupying the basal part, except a more or less evident median red patch, the hind margin of this black having two small projections. Fourth antennal joint as long as fifth, and not so long as 2 + 3; flagellum without facets beneath. Allied to *S. clematidis* Rob.; peculiar for the clear white wings.

Hab. North Four-mile Cañon, Boulder County, Colorado

(type locality). September 3rd, 1907 (S. A. Rohwer) ; Jim Creek, September 7th, 1907 (G. M. Hite).

Ashmeadiella denticulata (Cresson).

The species of Colorado and New Mexico, generally known as *Ashmeadiella buconis* (Say), should apparently be called *denticulata*. The latter has been considered a synonym of *bucconis*, but the ventral scopa of the female is white, whereas it is yellowish in *bucconis*. *A. denticulata* was collected at Boulder, Colorado, August 28th, 1907, by Mr. S. A. Rohwer.

DESCRIPTIONS OF TWO NEW SPECIES OF CHRYSIDIDÆ FROM BORNEO.

By P. CAMERON.

Hedychrum borneanum, sp. nov.

Green, with brassy tints, the centre of mesonotum blue, ocellar region and the apical segment of abdomen tinged with purple, antennal scape and pedicle green, the flagellum black, wings hyaline, tinged with violaceous, the nervures black; tarsi rufo-testaceous. ♀. Length, 6 mm.

Kuching, Borneo (John Hewitt).

Vertex with fine widely, irregularly separated punctures; the front with much larger punctures, more closely pressed, below, laterally, almost forming reticulations; the space below the antennæ smooth. Mandibles green, brownish at the apex. Outer orbits for the greater part finely, closely, longitudinally striated. Pronotum smooth, impunctate, as is also the mesonotum, except for a row of large deep punctures along the outer edge. Scutellum smooth, with two large round punctures on the outer edge. Basal part of metanotum covered with large round deep punctures; the apical slope with an area in the centre above, transverse above, the apex obliquely narrowed to a point below. Propleuræ strongly punctured above, smooth below, the smooth part dilated upwards at the base. Mesopleuræ with large clearly separated punctures, the lowest of which form a regular longitudinal row; below is a row of six larger squarish foveæ, in a depression, bordered above and below by a keel. In the centre of the metanotum are two large areas, the basal squarish, the apical smaller and oval. Abdomen smooth and shining, the lower edge white and membranous. As usual, the frontal depression is finely transversely striated.

Chrysis (Heptachrysis) hewittii, sp. nov.

Green; the head, thorax, and basal segment of abdomen with a brassy tint; the ocellar region, the basal half of middle lobe of mesonotum, and the base of second abdominal segment narrowly, indigo-blue. Antennal scape and the basal two joints of flagellum dark

green, the rest of flagellum black. Legs green, the coxæ and four anterior femora behind brassy, the tarsi black. Wings hyaline, slightly suffused with violaceous, the nervures black. ♀. Length, 7-8 mm.

Kuching, Borneo (John Hewitt).

Front and vertex above the keel closely covered with round punctures, with sharp borders; immediately below the keel is a raised border of similar punctures; the depressed part below the latter is closely, somewhat obliquely striated, there being a narrow, shallow furrow down the centre. Outer edges of face punctured. Apex of clypeus smooth, broadly rounded. Mandibles dark purple, the extreme base green, followed by a brassy band. Thorax closely covered with round deep punctures, those on the pronotum finer, those on the metanotum coarser than those on the mesonotum. There is a smooth depression in the centre of propleuræ, bordered below by a broad roundly curved margin. Metapleuræ smooth above, below irregularly, finely striated. The lateral angles of metanotum project into stout triangular teeth. The scutellum is bordered laterally by a wide furrow. The first abdominal segment is more strongly and more widely punctured than the second and third. The four teeth on the latter are wide and short; it is more finely and closely punctured than the second, there are four foveæ on either side, they are deep and longer than wide; outside the outer tooth are two smaller and more indistinct foveæ or depressions. There is a fine but distinct narrow keel down the centre of the ventral surface.

NOTES AND OBSERVATIONS.

PIERIS BRASSICÆ LARVÆ IN JANUARY.—On reading Mr. Frohawk's note (*antea*, p. 39), I thought the following note from my diary would be interesting to your readers:—"Very mild winter; found several larvæ of *Pieris brassicæ* in my garden, January 10th, 1884."—W. E. BUTLER; Hayling House, Oxford Road, Reading, February 13th, 1908.

WINTER BROOD OF DASYCHIRA PUDIBUNDA.—It may possibly interest some readers to know that I have had a winter brood of *D. pudibunda* out in one of my breeding-cages. They were not "forced" in any way beyond being kept indoors in a cold greenhouse. The larvæ spun up in August last, and the first imago (a female) appeared on September 29th, then four females in October, eleven females and six males in November, two females and six males in December, and two males in January, 1908. The last came out on January 17th.—J. J. JACOBS; St. Clair House, Gillingham, Kent, Feb. 8th, 1908.

NOTE ON THE LARVA OF ACIDALIA OSSEATA.—I am writing to you in reference to larvæ of *Acidalia osseata*. I find that they will eat the moss *Hylocomium triquetrum*. I took a female last August, which laid a few ova; these hatched in about three weeks, and the larvæ fed on knotgrass. They continued to feed until the end of

September, when they started to hibernate, and were put into a metal box with dried moss of the species mentioned above. I did not look at them again until mid-January, 1908, when I found that they had grown very considerably. I should be interested to know if any other readers of the 'Entomologist' have had any similar experiences.—F. POPE; 11, Portland Street, Newtown, Exeter.

CAPTURES AND FIELD REPORTS.

CARADRINA AMBIGUA IN DEVONSHIRE.—Last year I took five specimens of this species, and Mr. Blanchford captured three others.—F. POPE; 11, Portland Street, Newtown, Exeter.

NOTES FROM THE NORTH-WEST.—The year 1907 will probably be remembered for some time by collectors in the British Isles, and indeed in Southern and Western Europe, as a year with a bad general character. Gloom, rain, wind, and cold were too often the temper of the sullen year. On January 23rd the whole of Europe was in an icy grip, and the rare spectacle of snow was witnessed in Naples and Athens. February was little less severe than January, and it was March 16th before a friend and I could pay our first visit of the season to Delamere Forest. Nothing entomological rewarded us except six *Phygadeuon pilosaria*, and a solitary *Hybernina leucophæaria*, taken at rest on tree trunks. Two *pilosaria*, the same number of *leucophæaria*, three *H. progemma* (one a var. *fuscata*), a couple of *Anisopteryx ascularia*, one *Larentia multistrigaria* and a *Tortricodes hyemana* were the list for another day (the 23rd) in the same locality. In fact, Delamere Forest seems to be not worth working for imagines now until the end of April.

It was interesting to note that our March captures had not got rid of the cyanide until the third day after killing, a difference of, say, two days after geometers were relaxed and fit to set when killed in June—that is, geometers killed in June are, as a rule, relaxed and fit to set the day after death by cyanide. The cyanogen naturally escapes quicker in a warm than in a cold temperature.

In solemn state the Holy Week went by, And Easter Sunday gleamed upon the sky. And it was positively fine, sunny, dry and warm. On April 1st (Easter Monday) I saw my first butterfly of the season—a *Pieris rapæ*, fresh from the chrysalis. Next day my eyes were gladdened by a *Vanessa urticae*, hibernated of course, busily seeking for nettles whereon to lay its eggs—and then came a frost, "a chilling frost," and it was months before we had another really fine day (July 5th). In fact, the April of 1907 was one of the three wettest for forty-one years—the sunshine was five hours short of the average, and the temperature was exceedingly fickle.

May came in with snow in Westmorland, on the Pennine Chain, in Shropshire and North Devon. On the 8th Mr. J. Thompson, of Chester, and I went to the Wallasey sandhills. We were too late for *Nyssia zonaria*, and too early for *Eubolia lineolata*; but we got two batches of *Teniocampa opima* eggs by searching dead plants, twenty-

one hibernated larvæ of *Lasioampa quercus* (? var. *callunæ*) and three hibernated larvæ of *Arctia caia*.

The eggs of *T. opima* hatched a few days after, and the larvæ were full-fed on the 16th of July. In spite of giving them plenty of air and room in large flowerpots nearly filled with soil, and with net over the top and a piece of glass almost covering it to keep the food (sallow) fresh, I lost exactly fifty per cent., chiefly in the last stage, through diarrhoea.

My share of the *L. quercus* larvæ was eleven. They were all nearly full grown, and soon spun up. Five moths (two males and three females) emerged between July 20th and July 26th—the rest (six) are lying over the winter. Mr. South, in his welcome book, 'The Moths of the British Isles,' p. 116, refers to "the outward turn of the lower ends of the yellow bands" in the northern variety *callunæ*. Four of my five moths have this feature strongly marked; a female is referable to the pale southern form (the true *quercus*) and is without this outward turn of the lower ends of the yellow bands; one male possesses the buff-yellow basal patch; and the other male has the right upper wing and the outer third of the right lower wing coloured as in the female. The left upper wing has also a costal suffusion of this feminine tint.

On the 15th of May half a dozen Chester pupæ of *Spilosoma menthastri* I had kept out of doors through the winter began to turn out imagos. Two of the latter are worth special notice as follows:—No. 1. Upper wings buff—a broad, uniform streak of white from the base of the wing to very near the outer margin. The streak is situated above the inner margin, and runs parallel to it. The black spots are well developed on the upper wings, and especially large on the lower wings. No. 2. The left lower wing is two-thirds smoky-black from the outer angle inwards towards the base. One or two streaks of this smoky-black appear on the right lower wing. The upper wings are fairly normal, but inclined to buff, and well spotted. A result of the advent of these interesting specimens is that I have a large number of Chester pupæ lying, naturally, through the winter, in the hope that further developments in melanism will show in the species next May.

On May 18th I took off tree trunks nine male and three female *Tephrosia biundularia*, in Delamere Forest. They were all typical specimens of the Delamere dark form. From eggs laid by these females, and resultant pupæ now lying over the winter, I have little doubt about getting two or three, or more, of black examples with the white zigzag line near the wing margins. There can be no question that the species is single-brooded at Delamere.

Throughout May and continued into August I made many excursions among the romantic Denbighshire hills and valleys—sometimes alone and sometimes with pleasant companions, all with Nature hobbies. The only drawback was the unseasonable weather. On May 19th (Whit-Monday) there were cold northern airs, and a cloudy sky occasionally lit up by gleams of weak, wintry sunshine. There were six degrees of frost at Hampton Court, four degrees at Oxford, and it was ten degrees warmer in Iceland than at Folkestone, doubtless through the influence of the Gulf Stream. In fact, we had

December weather. Whit-Monday, however, occurred very early in 1907—a fortnight earlier than in 1906—so some allowance should be made. And if the May visits into Denbighshire were almost entomological blanks, they were worth taking if only to admire the wealth of wild flowers on the hedge bank—primroses in profusion, the reddest of red cumpions, hyacinths, yellow as well as white dead nettles, violets, wood sorrel, stitchwort, &c. Three *Lycæna argolus* were taken at rest off a holly hedge on the base of Minerva Mountain on the 19th. This butterfly is single-brooded here. Second broods, it is reported, have either failed to occur or have been poorly represented, in 1907, in localities north of Warwickshire, probably owing to the unfavourable season. The butterfly was unusually scarce in Denbighshire. Four males and a couple of females were taken, June 1st. Two of these were found resting on a holly hedge, and the remaining four were beaten out of it. A male and female were netted on the wing, June 8th—all in the same locality—and these were the last seen. It is hardly possible to examine these “blues” without calling to mind Darwin’s theory in his ‘Origin of Species.’ The Creator evidently bequeathed such a liberty of development—new insect colour-forms arising even in a lifetime—that it is possible all the “blues” were evolved from one original type through exterior causes which are lumped together under the head of “environment.” And Charles Kingsley saw nothing in the acceptance of this possibility which militated against the Bible story of creation. (See ‘Life and Letters of Charles Darwin.’)

From Wrexham to Llangollen *Numeria pulveraria* is a common geometer. Here the dark bar on the upper wings is wider than in my series from Kent, and the ground colour in both sexes is paler. In beating the hedges we netted four on the 1st of June, together with *Melanippe fluctuata*, *Coremia unidentaria*, a solitary *Anticlea badrata* (a late specimen, but perfect), and *Eupithecia vulgata*. Flying over the grass were numerous *Emmelesia albulata*, and a typical female *Odontopera bidentata* was discovered resting at the foot of a hedge. *Eubolia palumbaria*, *M. montanata*, and a female *S. mendica* (the latter very rarely met with in the Chester district) were added to the list on the 8th—together with larvæ of *V. urticae* off nettles. One of the *pulveraria* females is a pale buff, almost unicolorous and with faint markings. She laid a few eggs, and the larvæ pupated during August. We found *Acronycta menyanthidis* commonly enough on the heather tops in June. The form here has a pale, bright ground colour, with clearly defined dark markings. One I found at rest on a tree in the lowland—a mile away from the heather—on the 15th, evidently driven off by the previous day’s stormy weather.

About the middle of the month a friend called me into his garden to look at his hollyhocks, the leaves of which were spun together and well riddled by tortrix larvæ. They turned out to be *Tortrix forsterana*. The plants were saved from further mischief by picking off the larvæ, many of which I reared as imagoes. At Burton Point, on the Dee estuary, I found larvæ of *Aspis udmaniana* plentiful in spun-together bramble shoots, June 19th.

Midsummer Day (June 24th). In the last forty years the highest temperature has not reached sixty degrees on five occasions—in the years 1871, 1877, 1885, 1894 and 1901. The lowest maximum temperature recorded on Midsummer Day in these years is fifty-five degrees, in 1885. The reading for Midsummer Day, 1907, was fifty-three degrees! The maximum recorded is seventy-eight, in 1887. Altogether, the June of 1907 fully deserved the character of "a doleful June." The skies were generally clouded, and the weather cold and wet. Snow fell in Scotland, in Westmorland, and North Yorkshire on the 25th. The climatic conditions were probably unique to the present generation.

Macaria liturata—quite fifty per cent. of which were the variety *nigro-fulvata* (Collins)—began to emerge on the 11th from Delamere Forest larvæ; and *Agrotis ashworthii*, from Denbighshire larvæ collected in April, came out well from June 28th to July 18th. The month (June) ended with a thunderstorm.

Aplecta nebulosa, reared from Delamere Forest caterpillars, appeared during the latter part of June and beginning of July. The percentage of the variety *robsoni* ranged from four to eight, but we failed to get *thompsoni*. Both these forms are faithfully figured in "The Moths of the British Isles," p. 241, with the aid of photography and colour printing—*robsoni* with its grey fringes, and *thompsoni* with its white fringes.

With the exception of the 5th and 12th, July ran on to the 14th before we had a week of warmth. The chilly weather extended from the British Isles to the Azores. The coldest places on the 2nd were Belfast, Clacton and Nottingham, which all shivered in a temperature of forty-one degrees. It was colder in London than in the middle of November, 1906, when the thermometer rose comfortably to sixty-one degrees. Snow fell at Zermatt and was lying upon the hills within a few feet of newly cut hay!

On the 16th the electric lamps became worth working. The following is a list for that date—all taken about midnight, or after, and resting on the walls or pavement within a dozen yards of the lamps:—*Notodonta dictæa* (including the first female I ever took at the lamps and she obliged me with two hundred and fifty white eggs which began hatching on the 24th), *S. lubricipeda* and *S. menthastri*, *Miana strigilis* (all dark), *Caradrina morpheus*, *C. cubicularis*, *A. exclamationis*, *Xylophasia polyodon*, *Habrostola triplasia*, *Plusia iota*, *Uropteryx sambucaria*, *Amphidasys betularia* var. *doubledayi*, *Rumia crataegata*, *Boarmia rhomboularia* and *Paraponyx stratiotalis*. On the 17th this list was varied by the appearance of *N. dictæoides*, *Hermania derivalis* and a black *X. polyodon*. On July 18th further additions were *A. caia*, *Phalera bucephala*, *P. festucae* and *Phorodesma bajularia*.—J. ARKLE; Chester.

(To be continued.)

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, February 5th, 1908.*—Mr. C. O. Waterhouse, President, in the chair.—The President announced that he had nominated Dr. Thomas Algernon Chapman, M.D., F.Z.S., Professor Raphael Meldola, F.R.S., F.C.S., and Mr. Henry Rowland-Brown, M.A., as Vice-Presidents for the Session 1908–9.—The President announced that the Council had elected Mr. James William Tutt to serve as a member of the Council in the place of the late Mr. Arthur John Chitty, deceased.—Mr. C. Gordon Hewitt, M.Sc., of the University, Manchester, was elected a Fellow of the Society.—Dr. T. A. Chapman exhibited a collection of butterflies made last summer at Gavarnie, in the Pyrenees, including a number of specimens of *Erebia lefebvieri*, with *E. melas* from South-east Hungary, for comparison. He pointed out, and illustrated by means of enlarged photographs, the superficial differences in the wing-markings between the two species, and also drew attention to the fact that specimens of *Lycena orbitulus* taken on the Simplon, Switzerland, are identical with *L. orbitulus* var. *oberthurni* of the Pyrenees.—Mr. H. St.-John Donisthorpe showed eleven species of ants taken in the hothouses in Kew Gardens in December, 1907, and January, 1908, eight being new to the published Kew list, and six species not before recorded as introduced in Britain.—Mr. J. E. Collin brought for exhibition microscopically mounted specimens of *Epidapus scabrei*, Hopk., a potato pest in the United States, and recently discovered in England attacking narcissus-bulbs by Mr. H. J. Charbonnier, of Bristol.—Commander J. J. Walker showed, on behalf of Mr. A. H. Hamm, very young larvæ of *Bitars muralis*, hatched at end of October and beginning of November from ova laid by females in captivity (the natural place of deposit of these eggs being at the entrance to the burrow of the bee, *Anthophora pilipes*, in stone walls near Oxford). He also exhibited two specimens of the rare *Pyralis lienigialis*, Zell., female, taken at light in his house at Summertown August, 1906 and 1907.—Mr. Rowland E. Turner brought for exhibition a box of Thynnidae from S. America, mostly from Chile, and several new species from Mendoza and the Peruvian Andes.—Prof. T. Hudson Beare exhibited a specimen of *Trachyphloeus scabriscutis*, taken at St. Margaret's Bay in August, 1907, with the two deciduous mandibles still in place.—Lieut.-Colonel Manders exhibited the female of *Papilio phorbanta* from Bourbon, an aberrant member of the *Nereus* group of Papilios, and compared it with the other members of the same group from the African mainland, Madagascar, and Mauritius, kindly lent for the purpose by Professor Poulton. He pointed out that, whereas in all the other species the females were some shade of green similar to the males, the Bourbon insect was more or less uniformly brown. He suggested that this was due to mimicry, *Euplexa goudoti*, a species strictly confined to Bourbon, being the model.—Dr. K. Jordan exhibited, on behalf of the Hon. Walter Rothschild, some interesting Papilionids, including *Troides alexandrae*, Rothsch., remarkable for the beauty of the male, and the

gigantic size of the female, a new discovery by A. S. Meek, who found this fine insect in the north-eastern portion of British New Guinea, at some distance inland from the coast; and a gynandromorphic specimen of *Troides*, the only one known of this genus, obtained by Dr. L. Martin in South Celebes. It belongs to *T. haliphron*, the left side being female and the right side male.—Mr. R. Adkin exhibited specimens of *Tortrix pronubana*, Hb., reared in June and July from larvæ collected in May, also others reared in autumn from ova deposited by moths of the June emergence. He concluded that when the habits of the species came to be better understood, it would be found to be practically continuously brooded in this country, as had been shown to be the case in Guernsey.—Mr. L. W. Newman showed long series of *Melitæa aurinia*, from many localities in the United Kingdom, and *Notodonta chaonia*, to illustrate the wide superficial variation of the respective species.—Dr. F. A. Dixey exhibited specimens of *Nychitona medusa*, Cram., and *Pseudopontia paradoxu*, Feld., observing that a former suggestion of his as to a mimetic relation between them had been confirmed by a letter lately received from Mr. S. A. Neave, at present in the Congo State, who wrote that the two forms “inhabit exactly the same localities, and are barely distinguishable from each other on the wing.”—Mr. Rowland E. Turner communicated a paper “On Two Diplopterous Hymenoptera from Queensland,” and “Notes on Thynnidæ, with remarks on some Aberrant Genera of the Scoliidæ.”—Mr. Guy A. K. Marshall read a paper “On Diaposematism, with reference to some Limitations of the Müllerian Hypothesis of Mimicry.” In this he pointed out the difficulty of accepting the idea of a mutual simultaneous mimicry between two unpalatable species, such as is postulated by the hypothesis of Diaposematism. A discussion was begun by Dr. F. A. Dixey and Professor E. B. Poulton, and adjourned to the next meeting.—The General Meeting which followed was adjourned to March 4th.—H. ROWLAND-BROWN, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*January 9th, 1908.*—Mr. R. Adkin, F.E.S., President, in the chair.—Mr. Sich exhibited a specimen of *Plodia interpunctella*, captured in the Society's rooms.—Mr. Gadgo, specimens of *Malicossoma neustria*, from Chingford larvæ; one without a rudiment of the right hind wing, and the other with an extremely small left fore wing.—Mr. Turner, *Dercas verhuelli*, a Pierid near *G. rhamni*; and the “map” butterfly, *Cyrestis thyodamas*, both from the Khasia Hills, India.—Dr. Hodgson and Mr. Grosvenor, series and specimens of *Aricia agestis* (*astrarche*), including var. *salmacis*, ab. *obsoleta*, ab. *alpina*, var. *artaxerxes*, ab. *allous*, &c., from Reigate, Sussex, North England, and Aberdeen.—Mr. Adkin, series of *Tortrix pronubana*, *T. podana*, *T. heparana*, *T. rosana*, *T. forsterana*, and *Batodes angustiorana*, reared from larvæ taken on *Euonymus japonicus* at Eastbourne, in May and June, 1907; and read a paper entitled, “Further Notes on *Tortrix pronubana*, including its Life-history in Britain.”—Reports of the various field-meetings held during 1907 were submitted and read.—HY. J. TURNER, *Hon. Rep. Secretary*.

Annual Meeting, January 23rd, 1908.—Mr. R. Adkin, F.E.S.,

President, in the chair.—The Balance Sheet and Council's Report were read, and showed that the Society had closed another year of usefulness. The retiring President, Mr. R. Adkin, then read the Annual Address, in which, after dealing with recent entomological discoveries, observations, &c., he reviewed the past history of the Society at some length. The following is a list of the Officers and Council for the ensuing year:—President, A. Sich, F.E.S.; Vice-Presidents, R. Adkin, F.E.S., and W. J. Kaye, F.E.S.; Treasurer, T. W. Hall, F.E.S.; Librarian, A. W. Dods; Curator, W. West (Greenwich); Hon. Corresponding Secretary, Stanley Edwards, F.L.S., F.Z.S.; Hon. Report Secretary, Hy. J. Turner, F.E.S.; Council, S. R. Ashby, F.E.S.; T. A. Chapman, M.D., F.Z.S., F.E.S.; H. Main, B.Sc., F.E.S.; A. L. Rayward, F.E.S.; E. Step, F.L.S.; and A. E. Tonge, F.E.S. In taking the chair Mr. Alfred Sich proposed and Mr. Step seconded a vote of thanks to Mr. Adkin, and Mr. Tutt, at some length, paid a warm tribute to the appreciation of Mr. Adkin's services in the Society for so many years.—Mr. B. Smith, of Upper Norwood, and Mr. E. R. Goffe, of Wandsworth Common, were elected members.—Mr. Rayward exhibited the hibernating larvæ of *Pseudoterpna pruinata*, on the stems of *Genista anglica*.—Mr. Newman, a large and varied series of *Amorpha populi*, mostly from captured larvæ.—HY. J. TURNER, *Hon. Rep. Secretary*.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held at the Royal Institution, Colquitt Street, Liverpool, on the 20th January, 1908, Mr. Wm. Mansbridge, Vice-President, in the chair.—Mr. Robert Adkin, F.E.S., of Lewisham, was elected a member of the Society.—Mr. Oulton Harrison read a paper descriptive of recent photographs by Messrs. Harrison and Main, of London, illustrated by lantern slides of many interesting species and varieties of Lepidoptera in their various stages.—Dr. J. Cotton exhibited lantern-slides of Lepidoptera photographed in their natural colours by Lumière's process. The stereoscopic effect of the objects represented was especially noticed in this exhibit.—The Hon. Sec. exhibited, on behalf of Mr. T. Baxter, of St. Anne's-on-Sea, a case containing some of the most interesting varieties captured in 1907; they were as follows, *viz.*, (1) A long series of *Peronea hastiana*, comprising vars. *logiana*, Hüb., *divisana*, Stt., *leucophaea*, Bent., *albistriana*, Haw., *mayrana*, Hüb., *combustana*, Hüb., *centrovittana*, Steph., and other forms combining distinctly two of these, *viz.*, *logiana-centrovittana*, *leucophaea-mayrana*, and *albistriana-mayrana*; further, a water-colour drawing of other named variations captured or bred in previous years at St. Anne's. (2) *Agrotis cursoria* var. *costæcerulea*, Tutt, and var. *obscura*, Tutt, the latter being exceptionally dark. (3) A varied series of *Cudaria immanata*, taken at Forres. (4) A series of *Melanthia bicolorata*, showing transition from the type to var. *plumbata*, also from Forres. (5) Series of *Polia* var. *olivacea*, including a dark specimen, all from Co. Durham. (6) A fine variety of *Acronycta rumieis*, taken at St. Anne's in 1905; the basal, submarginal, and marginal areas black, otherwise as the type. (7) A short series of *Camptogramma bilineata*, banded form from Forres. (8) *Zygæna filipendula* var. *hippocrepidis*, and one with the outer spots only confluent,

St. Anne's. (9) *Satyrus semcle*, from St. Anne's and Fifeshire coast, the latter bearing much stronger markings on the under side; this form also occurs on the Crosby sandhills, but not at St. Anne's. (10) *Epinephele ianra*, from Fifeshire. (11) Series of *Lycæna icarus*, from coast of Fifo, including a var. of the female with the spots of the under side showing through the wing as whitish blotches, and under side vars. of the male with many of the spots obsolete, or nearly so; all the females were exceptionally bright. (12) An ochreous var. of *Amphidasys betularia* female, captured wild at St. Anne's, June, 1891; also a fine intermediate, bred from typical male \times *doubledayaria* female.—Mr. Robert Adkin showed a series of *Tortrix prouibana*, bred from Eastbourne larvæ in 1907.—Mr. J. J. Richardson, an aberration of *Halia vaularia*, taken at light, Sefton Park, Liverpool.—H. R. SWEETING and WM. MANSBRIDGE, *Hon. Secs.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*January 17th, 1908.* Rev. C. R. N. Burrows exhibited *Cucullia verbasci*, bred by Mr. Norgate from larvæ taken end of July, 1906, the imagines emerging in early May, 1907; some of the specimens were typical, but others were so light, and others again so dark, as to make them hardly recognizable as *C. verbasci*.—Mr. S. J. Bell, *Abraxas ulmata*, ranging from specimens with black markings almost obsolete to others in which these formed almost continuous fasciæ, Chalfont Road, July, 1906 and 1907.—Dr. S. A. Chapman, *Pterophorus brachydactylus*, a third generation bred at Reigate from Swiss stock.—Mr. J. A. Clark, two fine *Arctia caia* abs., one with yellow hind wings, from Leyton, the other with fore wings almost entirely deep brown with mere traces of the usual cream ground colour, and hind wings of an orange shade with black nervures and the black spots forming two wide bands.—Mr. H. M. Edelsten, *Sesia andreniformis*, bred in 1907, from Kent and Bedfordshire; also its rare parasite *Meniscus bilineatus*.—Mr. T. H. L. Grosvenor, very yellow *Pieris napi*, from Aberdeen; also *P. brassicae*, from same locality, with fore wings heavily speckled with black at the base, and under side of hind wings similarly powdered.—Mr. A. Hemming, *Deilephila euphorbiae*, taken at Eastbourne, 1907.—Mr. A. W. Mera, *Abraxas grossulariata* abs., from London and Aberdeen; in the London specimens the increase of black marking was usually most noticeable at the base of the wings, while the Scotch aberrations were usually blackest on the marginal areas.—Mr. L. W. Newman, *Notodontus chaonia*, bred from Perth and New Forest, those from the former district being much darker than the Hampshire broods.—Mr. P. H. Tautz, *Xylina semibrunnea*, from Brighton, and *Luperina cespitis* from Richmond Park.

January 21st.—Mr. L. W. Newman, *Smerinthus populi*, from Bexley, females varying from very light to very dark specimens.—Mr. P. H. Tautz, two series of *Vanessa io*, bred in 1905 and 1906 from larvæ taken at Chalfont Road and Chorley Wood respectively; the 1905 brood were normal, but those bred in 1906 had a transparent greasy appearance, while the ground colour of the wings was a pale dingy brown.—Mr. A. J. Willsdon, *Pararge egeria*, bred January 20th, from ova laid by females taken at Torquay, end of September, 1907. The first imago appeared on December 25th, and it was

noticed that, although the pupæ remained in the warm room in which the larvæ were reared, emergence ceased whenever frost set in, and was not resumed until milder weather returned.—Dr. G. G. C. Hodgson read a paper in which he advanced the theory that variations in climatic conditions tended to increase or decrease sexual dimorphism; from observations made and material collected during a number of years he deduced the apparent facts that in hot sunny years sexual dimorphism was increased, while in cold rainy years this dimorphism was lessened.—S. T. BELL, *Hon. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*January 20th, 1908.*—Mr. G. T. Bethune-Baker, President, in the chair.—Mr. J. T. Fountain showed larva of *Lasiocampa quercus* L. from near Barmouth, together under the Tachinid parasites *Tachina larvarum*, L., which he had bred from it.—Mr. G. T. Bethune-Baker, a fine collection of African Papilionidæ in three boxes.—Mr. C. J. Wainwright, *Platycheirus melanopsis* Lw., female from Riffelalp, Valais, Switzerland; also *Campsicnemus magnus*, Lw., and called attention to the extraordinary tarsi in the male sex.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

HERTFORDSHIRE NATURAL HISTORY SOCIETY.—At the December meeting of this Society, held at the County Museum, St. Albans, Dr. John Morison, Vice-President, in the chair, Mr. A. E. Gibbs, the Hon. Secretary, exhibited a small collection of butterflies received from a correspondent in Japan, and compared the forms of the same species found at the extreme eastern and western limits of the Palæarctic Region. He pointed out that the Japanese insects were, as a rule, larger in size and darker in colour than the British forms, and exhibited specimens of *Papilio machaon*, *Pieris rapæ*, *P. napi*, *Chrysophanus phlaeus*, and others in illustration of this fact. At the meeting of the same Society held on January 28th, Mr. Gibbs exhibited a small collection of Diptera in four drawers, which Mr. P. J. Barraud, Mr. T. F. Furnival and he had collected for and presented to the County Museum. The families which contained the smaller species were very poorly represented, and Mr. Gibbs expressed the hope that some member of the Society would undertake the study of them.—A. E. GIBBS, St. Albans.

RECENT LITERATURE.

The Agricultural Journal of India. Vol. ii., parts i.-iv. (January, April, July, October, 1907).

THE entomological articles are by Mr. H. Maxwell Lefroy, and comprise "Surface Caterpillars," pp. 42-46; "Insect Pests of India," pp. 109-115; "Locusts in India," pp. 238-245, plates xiv.-xx.; "Practical Remedies for Insect Pests," pp. 355-363; and "The Tse-Tse Fly in India," pp. 374-376. On the coloured plates illustrating the first-named articles are figures of *Agrotis ypsilon*, Rott., and its early stages; also figures of *A. flammatra*, Schiff., *E. spinifera*, Schiff., and *E. segetis*, Hübner.

Memoirs of the Department of Agriculture in India.

NUMBERS 1-5, published during 1907, have been received. In these Mr. H. Maxwell Lefroy, the Imperial Entomologist, treats of "The Bombay Locust" (No. 1), and "The More Important Insects Injurious to Indian Agriculture" (No. 2), pp. 1-252. In No. 3, "The Indian Surface Caterpillars of the Genus *Agrotis*" are dealt with by Mr. Lefroy (pp. 253-259); and Mr. C. C. Ghosh contributes "The Life-history of *Agrotis ypsilon*" (pp. 260-274). Dr. Harold H. Mann discusses "Individual and Seasonal Variation in *Helopeltis theivora*, Waterhouse" (No. 4), and adds a description of a new species of the genus (pp. 275-337). No. 5 contains a paper by Mr. E. E. Green and Dr. Mann, entitled "The Coccidæ attacking the Tea-plant in India and Ceylon" (pp. 338-355). There are a number of plates, mostly coloured, and many illustrations in the text.

United States Department of Agriculture:—

Bulletin No. 68, parts i.-v.—Papers by A. A. Girault and A. L. Quaintance on Deciduous Fruit Insects and Insecticides.

Bulletin No. 69.—The Chinch Bug (*Blissus leucopterus*, Say). By F. W. Webster.

Bulletin No. 70.—Report of the Meeting of Inspectors of Apiaries, San Antonio, Texas, November 12th, 1906.

Bulletin No. 72.—Information concerning the North American Fever Tick, with Notes on other Species. By W. D. Hunter and W. A. Hooker.

Bulletin No. 74.—Some Factors in the Natural Control of the Mexican Cotton Boll Weevils. By W. E. Hinds, Ph.D.

Bulletin No. 75.—Miscellaneous Papers on Agriculture. Part i.: Production and Care of Extracted Honey. By E. F. Phillips, Ph.D. Methods of Honey-testing for Bee Keepers. By C. A. Browne, Ph.D. Part ii.: Wax Moths and American Foul Brood. By E. F. Phillips.

From the 'Proceedings of the United States National Museum,' vol. xxxiii. :—

Descriptions of New North American Tineid Moths, with a Generic Table of the Family Blastobasidæ. By Lord Walsingham (October 29th, 1907).

The Dragonflies (Odonata) of Burma and Lower Siam. ii. Sub-families Cordulegasterinæ, Chlorogomphinæ, and Gomphinæ. By Edward Bruce Williamson (December 13th, 1907).

Papers by John B. Smith, Sc.D. :—

Notes on the Species of *Amathes*, Hübn. Pp. 345-379, plates ix. x. (Trans. Am. Ent. Soc. xxxiii., November, 1907).

Notes of the Brephidæ. Pp. 369-371 ('Canadian Entomologist,' November, 1907).

New Species and Genera of the Lepidopterous Family Noctuidæ for 1907. Pp. 91-127 (Annals New York Acad. Sci. vol. xviii. pt. ii. January 22nd, 1908).

OBITUARY.—We have heard with very great regret of the death of Mr. HERBERT GOSS. A further notice will appear in our next issue.

THE ENTOMOLOGIST

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[No. 539

JOHN THOMAS CARRINGTON.

WE regret to announce a further gap in the rapidly thinning ranks of the older entomologists.

Born on March 21st, 1846, John Thomas Carrington was the second son of Charles Carrington, of Crofts Bank House, Lancashire, and was educated at a private school at Mottram, Cheshire, and afterwards in Dublin. He originally studied for the medical profession, but after extensive travels in North and South America, and also in Africa, he finally adopted journalism as his profession.

In 1876, on the death of Edward Newman, he was appointed editor of this magazine, a position he occupied with conspicuous ability and tact until its purchase by the late Mr. John Henry Leech in 1890.

In 1878 he took a leading part in organizing and managing the National Entomological Exhibition at the Westminster Aquarium, at which the finest representative collection of British Entomology ever brought together was exhibited to the public. In 1893 he bought 'Science Gossip,' which he edited until it finally ceased in 1902. For many years he was one of the departmental (Natural History) editors of the 'Field.'

But it was not on the literary side alone that his energies showed themselves. An all-round naturalist, he delighted in getting away from business cares and carefully exploring the lesser known districts around London and Brighton. In the course of one of these excursions (September, 1896) he captured the unique British specimen of *Calophasia platyptera*, Esp. Those who had the good fortune to accompany him at any of these times will never forget the pleasure they gave. His knowledge of British Conchology, Botany, and Ornithology, so freely afforded, his carefully arranged routes, and above all his genial manner and the genuine pleasure he showed in pointing out some new feature or rare specimen, rendered them ever to be remembered.

He married (in 1869) Annette, youngest daughter of John Crawford, Esq., solicitor, of Holly Mount, Co. Meath, by whom he had three sons, two of whom, now resident in America, survive him.

He recently retired to Combe Martin, North Devon, where he took a great interest in the proposed reopening of the famous silver mines, but shortly before Christmas he contracted a severe chill, from the effects of which he never recovered, and after many weeks of acute suffering, patiently endured, pneumonia set in, and he died on March 5th, aged sixty-two.

C. A. B.

HERBERT GOSS, F.L.S., F.E.S.

HERBERT Goss died on February 14th last at his house in The Avenue, Surbiton Hill, after a somewhat lingering illness. Born in "the fifties" in Brompton, he early evinced a decided love for natural history, and there is a story in his family that he started butterfly hunting at the age of six with the top of a hat-box covered with muslin for a net! Educated by private tutors, he finally entered the Solicitors' Department of the General Post Office in May, 1871, retiring in June, 1906.

From his earliest boyhood he took a keen interest in the British Lepidoptera, and later specialized as an authority on fossil insects, his papers on the subject, contributed to the 'Entomologist's Monthly Magazine,'* being afterwards reprinted, and in this form they were widely read and appreciated both at home and abroad, and commented upon with favour by such authorities as Bargagli in the 'Bulletin of the Entomological Society of Italy' (Florence, 1886). As a Fellow of the Geological Society of London, he had already contributed to the 'Proceedings' the Insect Fauna of the Recent and Tertiary Periods (1877), of the Secondary or Mesozoic Period (1878), of the Primary or Palæozoic Period (1879), and lastly a paper "On some Recently Discovered Insects from Carboniferous and Silurian Rocks," while his "Geological Antiquity of Insects" appeared in 1880. Meanwhile many notices in the 'Entomologist's Monthly' and the 'Entomologist' testify to his keen interest and powers of observation in field-work, while presently as one of the first Secretaries in co-operation with the Rev. Canon W. N. Fowler, his experience in the General Post Office was destined to be of the greatest value to the then newly chartered Entomological Society of London. Elected a member in 1874, he joined the Council ten years later, and when Mr. E. A. Fitch and Mr. W. R. Kirby relinquished the

* See also "Notes on a Fossil Wing of a Dragonfly from the Bournemouth Leaf Beds," by H. Goss (*Entom.* vol. xi. p. 192), and "Fossil Insects" (*ibid.*, vol. xviii. p. 196).

secretaryship in the following year (1885) he stepped into one of the vacant places. Here he continued in office until the long partnership was dissolved at the close of 1896, when ill-health for a time compelled him to withdraw. But in 1901 he resumed his post until his final resignation at the end of 1904 of those duties which he had performed with such conspicuous ability and zeal. To his punctuality and precise habit of mind, characteristic alike of his entomological and official life, we owe much of the improved methods introduced into our 'Transactions' and 'Proceedings.' In the Council his advice was constantly sought, and willingly given, while he was equally ready to assist his brothers of the net with technical information, and as an incisive speaker and writer to champion their rights when the Government of the day was minded to enclose vast tracts of the wild and beautiful country in the New Forest, his particular and happy hunting-ground.* The results of some at least of his observations have been preserved in the laborious local catalogues of insects published in the 'Victoria County Histories.' The lists of Lepidoptera enumerated in the volumes for Hampshire, Sussex, Surrey, Devon, and Northamptonshire are largely his work; in the four first-mentioned counties they display a close intimacy with the insect fauna under review. Indeed, he had by his own personal field-work got together one of the most complete collections of British Butterflies in the country.

Goss's interests, however, were by no means confined to entomological and geological science. He was a first-rate musician—a brilliant pianist in his earlier days—and quite recently delivered a lecture at the Surbiton Institute on the "Band of Nebuchadnezzar," which was as full of archæological lore as of genuine humour. He also did good work on the Council of the National Trust for the Preservation of Places of Historic Interest or Natural Beauty, and possessed a considerable knowledge of botany, in pursuit of which he formed a herbarium containing many rare and valuable specimens.

In 1906 he was nominated one of the Vice-Presidents of the Entomological Society, and in this capacity he attended the last meeting at which he was present. His genial presence will be missed by many friends, and by none more than the writer of this notice, who was also his colleague for the whole of his second term of office as Secretary.

H. ROWLAND-BROWN.

* New Forest: "Trespassers will be Prosecuted," by Herbert Goss, F.L.S. (Entom. vol. xviii. p. 313).

GEOMETRID NOTES.

By LOUIS B. PROUT, F.E.S.

1. *OPEROPHTERA RELEGATA*, mihi, n. nom. = *NEXIFASCIATA*, Leech, nec Butl.

I find that the Japanese species of *Operophtera* catalogued by Mr. Leech (Ann. Mag. Nat. Hist. (6), xix. 671) as *Oporabia nexifasciata* has never been named. The true *O. nexifasciata* of Butler (Trans. Ent. Soc. Lond. 1881, 420) was, as his description and type-specimen show, synonymous with, or at least extremely close to, *Hydriomena furcata*, Thnbg. = *sordidata*, Fb., and the transference of the name evidently came about through Butler having placed it in *Oporabia*, and compared it with *dilutata*, which gives, at the outset, an entirely erroneous impression. I have measured the type-specimen, and find it barely 1 inch 5 lines, not "1 inch 6 lines," as Butler gives. The new species (*relegata*) is clearly an *Operophtera*, showing all the structural characters given by Meyrick for that genus.* Leech's description—"very closely allied to *Oporabia dilutata*, Bork., but the antennæ are more strongly fasciculated, and the first transverse band of primaries is straight"—evidently overlooks the neurata, and may be emended and amplified as follows:—

Operophtera relegata, mihi. — Male, 35–40 mm. Whitish grey, speckled with fuscous, more sparsely behind second band. Basal line angulated, followed by some very ill-defined dark lines or shadings; inner line at a little beyond one-third, accompanied behind by another line, the interspace usually filled in with fuscous so as to form a narrow bar which runs nearly straight from costa to inner margin, or slightly oblique inwards; outer line at beyond one-half, formed much as in *Epirrita dilutata*, followed by a rather broad diffuse fuscous shade, which is traversed by other indistinct lines, and forms a vague band; subterminal slightly nearer margin than in *E. dilutata*; marginal area more or less marked with fuscous, a short oblique dash just below apex; a very fine inconspicuous dark marginal line; fringes nearly concolorous, inner half slightly darker than outer, inconspicuously fuscous spotted at vein ends. Hind wings paler, traversed by a few indistinct pale fuscous lines, the most definite being near to and parallel with the hind margin. Under side weakly marked, otherwise similar to upper. A somewhat variable species in the distinctness and exact position of the transverse lines, but uniform in colour and general aspect. Female unknown. The male resembles *E. dilutata*, but with fore wings slightly narrower, and more acute at the apex.

* Vein 6 of the fore wings is shorter-stalked with 7–9 than in *O. brumata* and *boreata*, but this is liable to some individual variation in the genus; see *infra* on *O. japonaria*.

Japan (Pryer coll., &c.). Type (male) and six others in coll. Brit. Mus. One male in coll. L. B. Prout.

2. OPEROPHTERA JAPONARIA (Leech).

This species, described in Ent. Supp. 1891, 48, as *Oporabia japonaria*, must also, on account of the single long areole, be transferred to *Operophtera*. Vein 6, as in *O. relegata*, is normally short-stalked with 7-9, but in one aberrant specimen out of eight examined it arises separately from the angle of the cell. The female, like those of its true congeners, so far as they are known, is semiapterous. Leech merely says (*loc. cit.*) that it has "all the characteristic markings of the male"; the sole example from his collection shows the fore wings about the length of abdomen, narrower and more acute at the produced inner angle than in *O. boreata*, Hub., the hind wings very short and extremely narrow, apparently somewhat crippled.

3. CÆNOCALPE CENTROSTRIGARIA (Woll.).

This species, though not quite such a cosmopolitan as its cousin *fluviana*, has an even wider distribution than Staudinger ascribes to it. I have it from Jamaica and Buenos Ayres, and believe it occurs very generally in Atlantic America, both North and South. It has been suggested, though I think the suggestion is unpublished, that it is the *Eubolia custodiata* of Guenée (Spec. Gen. x. 490), in which case that would be the oldest name; but I hold the union to be impossible. Hulst's determination of *custodiata* as = *Ochyria guenéeata*, Pack., is much more satisfactory. At any rate, *custodiata* was a larger insect than *centrostrigaria*, and was described from California; whereas my friend Mr. R. F. Pearsall writes me that he does not know *centrostrigaria* from west of the Alleghany and Appalachian Mountains—at any rate, certainly not from the far west. The correct synonymy seems to be:—

Coremia centrostrigaria, Woll., Ann. Mag. (3), i. 119.

Phibalapteryx latirupta, Walk., xxxv. 1684.

Cidaria luscinata, Zell., Verh. Wien. xxiii. 205.

C. interruptata, Rbl., Ann. Hofmus. ix. 76.

Plemyria paranensis, Schs., Trans. Amer. Ent. Soc. xxvii. 273.

The last synonym is new, but is certain, according to examples named by Schaus himself.

4. ENTEPHRIA CÆSIATA (Schiff.).

Scarcely had the final proofs of my paper on the variation of this species (Trans. City Lond. Ent. Soc. pt. xvii. 1907) left my hands before I came across two references which I should have liked to include there. A synonym to *ab. annosata*, Zett., is var. (*ab.*) *nigristiaria*, Gregs. (Ent. v. 75), described as having "deep

blackish brown central band." [*Cidaria*] *Entephria aurata*, Pack., for which no reference is given in Dyar's list, was published in Proc. Bost. Soc. xi. 51 (1866), and is, as Grossbeck has just shown in some interesting Geometrid notes (Trans. Amer. Ent. Soc. xxxiii. 338) the oldest name for the eastern American species which has been passing for *cæsiata*, Schiff. Grote's *inventaria* will possibly prove a synonym of *Entephria aurata*.

5. CYLLOPODA JATROPHARIA (Linn.).

This common species is frequently recorded as *Cyllopoda* (or *Atyria* or *Flavinia*) *osiris*, Cram., and until recently stood under that name in the British Museum collection. As a result, when the rare form (or close ally) with the broad marginal band to the hind wings turned up in British Guiana, Mr. Warren (Nov. Zool. iv. 420) named it *Cyllopoda latimargo*, sp. nov.; whereas a reference to Cramer's figure shows that that is precisely the form which he named *osiris*, while Clerck's figure (no doubt from the Queen of Sweden's collection) shows with equal clearness that the common form is the *Phalæna Geometra jatrophia* of Linnæus. I only know the true *osiris* from British and Dutch Guiana. The corrected synonymy of the two forms is:—

(a) *Cyllopoda jatrophia* (Linn.).

Phalæna Geometra jatrophia, Linn., Syst. Nat. ed. 10, 523 (1758); Clerck, Ic. ii. tab. 55, 3 (1764).

Atyria osiris, auctt., nec Cram.

? *Cyllopoda ovata*, Warr., Nov. Zool. xiv. 198 (1907), syn. nov.

(b) *Cyllopoda osiris* (Cram.).

Phalæna osiris, Cram., Pap. Exot. ii. 28, tab. 115 E (1777).

Cyllopoda latimargo, Warr., Nov. Zool. iv. 420 (1897).

Cramer himself was the first to start the confusion, for on p. 151 he sinks his own species to that of Linnæus.

6. SEMIOTHISA REGULATA (Fabr.).

Guenée (Spec. Gén. x. 68) readily recognized the *Phalæna regulata* of Fabricius as "certainement de ce genre" (*Macaria* = *Semiothisa*), but was unable to decide to which of the many American species it should be referred. I have examined the type in the Banksian collection, and find it is the common species which Guenée himself named *enotata*. The following will be a sufficient synonymy:—

Phalæna regulata, Fb., Syst. Ent. 629 (1775).

P. notata, Stoll, in Cram. Pap. Exot. iv. 160, tab. 371, G, H (1781), nec Linn.

Macaria enotata, Guen., Spec. Gén. x. 69 (1858).

7. *SEMIOTHISA RICHARDSI*, mihi, sp. nov.*

Male, 25 or 26 mm. Pale fawn-colour, with extremely faint indications of somewhat darker, more ochreous transverse lines or shades. Fore wings with a pale outer line at just beyond two-thirds, nearly parallel to hind margin, but curving very slightly outwards at inner marginal end. In the region of this line and bisected by it are some blackish marks, namely. between veins 2-3, 3-4, 4-5 rather large wedges, the one between veins 4-5 the smallest, that between 3-4 the largest, further interrupted (as is also that between 2-3) near its outer extremity by another very fine pale line; between veins 5 and 8-9 smaller and more irregular dark spots, inclining to form a row of three each longitudinally. Hind wings also with pale post-medial line (which is here very indistinct), and with small irregular blackish markings on either side of it between veins 2 and 4. Fringes concolorous, fuscous-spotted. Under side bright golden brown, vaguely spotted with whitish, the whitish markings somewhat inclined to dispose themselves in transverse lines. Margins of wings almost even throughout, hind wings very slightly produced at vein 4.

Female unknown.

Tientsin; one male, in my collection.

In its ground colour and the general pose of the markings this species reminds somewhat of the least strongly-marked examples of *Semiothisa ornataria*, Leech (Ann. Mag. Nat. Hist. ser. 6, xix. 310) from Moupin, but besides the absence of the spot on costa towards apex and other slight differences of arrangement the shape of the wings and the scheme of the under side are quite different, agreeing with those of *Tephрина murmaria*, Schiff., in its brightest coloured forms. The antennal ciliations are normal for *Semiothisa*.

8. *STEGANIA HONESTA*, mihi, sp. nov.

Sexes similar. 26 mm. Fore wings reddish buff or pale testaceous, somewhat variable in different individuals, rather thickly but smoothly scaled, glossy. Two indistinctly darker transverse lines following practically the same course as in *Stegania trimaculata*, Vill., and starting from dark costal spots (deep red-brown or blackish), as in that species, but rather larger on the average. No third costal spot. The second line accompanied distally by a narrow paler line, which renders it more conspicuous. Outer margin very slightly darkened. Fringes concolorous with wing internally, grey externally, intersected with whitish at vein-ends. Hind wings much paler, especially interiorly, and traversed by a single darker line (sometimes very indistinct), following the same course as in *S. trimaculata*. Under side almost without markings, or (in some individuals) with the outer line of all wings more or less well expressed. Face deep buff, vertex white. Antennæ of male with rather long pectinations,

* Dedicated to my friend Mr. Percy Richards, to whose kindness I am indebted for this pretty little species, as well as for the one next to be described.

rapidly decreasing in length towards apex, which is simple ; of female shortly ciliated.

Tientsin. Types (male and female) in coll. L. B. Prout ; one male, one female in coll. Brit. Mus.

I refer this species provisionally to *Stegania*, with which it so well agrees in its general facies, but it is aberrant in having veins 10 and 11 long-stalked instead of coincident throughout (or "10 absent," as it is generally expressed). It is also slightly more robust, abdomen somewhat longer, palpi stronger.

NOTES ON *CARADRINA* (*LAPHYGMA*) *EXIGUA*.

By G. F. RAWLINGS.

My first meeting with this beautiful little moth was on May 30th, 1906, when I took a very fine male in perfect condition. I saw no more until August 9th, after which date I took some practically every night for a month, taking the last specimen on September 9th.

My best night was fourteen, total captures fifty-two ; but I saw several others during the month, which escaped.

They were very strong on the wing and very lively. Even on roughish nights when other insects were few, they soared about as though revelling in the wind. I have also noticed this with *ambigua*.

The moths were fairly regular in their arrival, the first generally arriving about 11 p.m., then at 12.30 and at 2 a.m., the last lot, as a rule, the largest in numbers. Nearly all the males have a beautiful process composed of very fine hairs radiating from a stalk attached to the thorax just between the front pair of legs and protruding forward, sometimes beyond the head ; it looks like very fine thistle-down.

Though I had about a dozen batches of ova, and must have hatched over a thousand larvæ, I did not succeed in pupating any. Most of them died off when apparently full-grown, though some died at an earlier stage.

The disease started with some larvæ of *Phalera* (*Pygæra*) *bucephala* I was trying to rear for experimental purposes, and though my larvæ were divided up very much, I lost all that I had.

The first ova were deposited on August 11th by a female captured on the 9th. They were deposited in small batches with here and there a few odd ones. In shape they reminded me of a sea urchin with longitudinal lines.

When fresh they look like small pearls, having the beautiful pearly lustre so conspicuous on the hind wings of the imago. About the fifth day they were grey, black on the sixth, and the larvæ hatched on the seventh.

The young larvæ in most cases ate their egg-shells, but some were left undamaged save for the hole made by the larva to escape from the shell.

The ova were attached to the box and covered with a downy mass of fine hairs, varying in colour from greyish-brown to white; the latter probably being the fringes of the hind wings, and the former from the body and thorax. In some cases the hairs were missing, the ova being quite exposed. I was unable to determine if these had been deposited by a female who had lost or used all her hairs or not, but from the very much greater proportion of covered ones, I am inclined to think that the covering is usual.

For a fuller description of the ova I cannot do better than refer the reader to the excellent article on the subject by Mr. Alfred Sich, F.E.S., on page 267 of the 'Entomologist' for December, 1906.

When first hatched the young larvæ were dark grey with black head and plate. They took readily to dock, plantain, *Calystigia sepium*, and *Convolvulus arvensis*. After feeding, they turned a pale greenish colour; spots appeared on the fifth day, and on the sixth, when they had apparently moulted, lines were discernible. Five days later these markings were much more brilliant and distinct. They varied in colour from pale apple-green to very dark sage, while others were pale brown with a slight pinkish tinge; others were darker brown, and some nearly black. All these varieties were of a pale ground colour, but the upper half was so lined and streaked with various shades and thicknesses of darker colour as to give it a shagreen-like appearance, the bands being formed by the different density and thickness of these lines and streaks. There is a gloss over all which gives the larvæ a most beautiful velvety appearance. Head, plate, and legs are black. The largest, apparently full-grown, larvæ measured slightly under an inch and a quarter when fully extended, of uniform and moderate thickness, tapering slightly at the first, second, and thirteenth segments. Spiracles very delicately outlined in dark green, brown, or black. Spiracular line white. The subdorsal band darker than the dorsal area, and equaling about half its width, and extending the whole length of the back; this band is bordered at its outside edge by a very much darker line, which divides it from the spiracular line. This darker line is broken up into a series of short lines extending in a forward direction from each spiracle to a small white spot, which is situated slightly behind and above the next spiracle. These short lines are broadest and most pronounced on the hinder portion of each segment, from where they touch the white spot, to the fold.

The space between each spiracle and its accompanying white spot is paler than the surrounding area, breaking up both the

dark and spiracular lines, the white spot looking as though it were a piece of the spiracular line, which it equals in width, placed slightly above but touching the interrupted end of the dark line. These markings are most pronounced on the spiracle-bearing segments, the dark lines being scarcely discernible on the second, third, and thirteenth. The white spots bear an exceedingly fine hair, are one-sixty-fourth of an inch in diameter, and are placed on the segment just midway between the folds.

The dorsal area is marked with a short, thick, dark dash, situated on the anterior edge of each segment, and extending down the centre of each about a quarter of its depth. A thin light-coloured line extends in a similar manner from the posterior edge of the segment towards the dark dash. The combined length of these two lines equals half the depth of the segment, the intervening space being the colour of the rest of the dorsal area. On each side of the dark dash, level with its hindmost point and midway between the centre of the back and the subdorsal band, there is a white spot about half the size of the spots near the spiracles.

The under surface is very pale and faintly marbled with the darker markings and whitish spots.

DESCRIPTIONS OF TWO NEW GENERA AND SPECIES OF ICHNEUMONIDÆ (XORIDINI) FROM BORNEO.

By P. CAMERON.

PARAXYLOPHRURUS, gen. nov.

Areolet small, four-angled, the transverse cubital nervures almost united in front; transverse median nervure interstitial; disco-cubital nervure unbroken; transverse median nervure in hind wings broken near the top. Head cubital, the temples of moderate size, roundly dilated; the occiput roundly incised, finely margined. Eyes large, converging below, reaching almost to the base of the mandibles. Mouth with a semicircular emargination. Mesonotum distinctly trilobate. Abdomen smooth, the first segment as long as the following two united, its under side toothed near the base, the narrowed basal part behind the prominent spiracles of equal width; the rest becomes gradually widened towards the apex. Legs (and particularly the hinder) long, the hind coxæ about four times longer than wide; claws with a tooth at the base. Tibiæ spinose, the anterior not contracted at the base. Ovipositor long. Mandibles of equal length. The middle lobe of mesonotum does not project above the lateral. Metanotum and metapleuræ closely reticulated; its spiracles rather small, twice longer than wide.

In Dr. Ashmead's classification this genus of Xoridini runs

close to *Xylophrurus*, which may be known from it by the transverse median nervure being broken *below* the middle.

In size, form, and coloration this genus resembles *Allostomus* here described, but may readily be separated from it by the semi-circular oral opening, and by the presence of an areolet in the fore wings. In Ashmead's tables the genus runs near to *Gabunia* and *Xylophrurus*, with neither of which has it any close relationship.

Paraxylophrurus maculiseutis, sp. nov.

Black; face, under side of antennal scape, the lower side of propleuræ, the line dilated at the base, the apex gradually narrowed, tegulæ, the scutellum except the basal slope, the mark rounded at the base, a semicircular mark on apex of post-scutellum, tubercles, a small mark below the hind wings, the first abdominal segment behind the spiracles, and lines on the apices of all of them, lemon-yellow. Legs of a brighter lemon-yellow; the apical two-thirds of the hind coxæ above, the basal three-fourths of the lower side, the apical joint of their trochanters and a band between the middle and apex of the hind tibiæ, black. Wings hyaline, the stigma and nervures black. ♀. Length, 13 mm.; terebra, 7 mm.

Kuching (John Hewitt).

The antennæ have a broad white band in the middle. Head, pro- and mesothorax smooth and shining, the metathorax closely reticulated all over. Abdomen smooth and shining. The four anterior tarsi and the apex of posterior fuscous. Tarsi closely spinose.

ALLOSTOMUS, gen. nov.

Wings without an areolet; neither the disco-cubital nor the second recurrent nervure broken by a stump; transverse median nervure received very shortly beyond the transverse basal; transverse median nervure in hind wings broken distinctly above the middle. Eyes large, converging below, reaching close to the base of the mandibles. Clypeus separated from the face, bounded at the sides and below by furrows, the lateral furrows the wider and ending above in a fovea. Mandibles unequal, edentate, bluntly pointed. There is a tubercle above and between the antennæ; the latter are as long as the body. Temples well developed, roundly dilated; occiput margined, roundly incised. Mesonotum trilobate. Metanotum longish, closely reticulated, the spiracles placed behind the middle, longish oval, about three times longer than wide. First abdominal segment longer than the second, its base half the length of the apex. Legs (including the four hinder coxæ) long, slender; the base of the tibiæ not contracted. The antennæ are broadly ringed with white. There is a long ovipositor. The prothorax broadly projects laterally, and is thus clearly separated from the mesothorax. Calcaria short. Claws conspicuous, curved. There are eight abdominal segments.

A distinct genus. In Ashmead's arrangement it comes in near *Clepticus* and *Epixorides*, with neither of which can it be confounded. *Lethulia*, Cam. (from Borneo) has three areæ on the metanotum, the abdominal petiole is longer than the follow-

ing three segments united, the four anterior claws are bifid, and the mandibles have a short subapical tooth.

Allostomus maculiseutis, sp. nov.

Black; the face, base of prothorax, a large mark on either side of the prosternum, tegulæ, tubercles, a line down the apex of mesopleuræ, the base of the first abdominal segment, and a line on the apices of all the segments, bright lemon-yellow. Legs yellow, tinged with fulvous; the apical half of all the coxæ above, more than the apical half of the posterior trochanters, the four anterior femora, the apex of the posterior all round, the four anterior tibiæ above, their tarsi, a mark near the base of the posterior tibiæ, their apex all round, and the apical joint of the hind tarsi, black. The apex of the sixth antennal joint and the following to the nineteenth white; the basal five joints (including the scape) are white below. Wings hyaline, the stigma and nervures black. ♀. Length, 14 mm.; terebra, 10 mm.

Kuching, November (John Hewitt).

Front almost smooth, the vertex sparsely punctured; the face sparsely but more strongly punctured. Pro- and mesothorax closely punctured, the outer side of the middle lobe of the latter striated; the propleuræ, except at the top and bottom, smooth. Metathorax closely reticulated; there is a keel over the metasternum. Basal two segments of abdomen distinctly, closely, the third weakly punctured; the others almost smooth. The metathorax and coxæ are thickly covered with short white pubescence.

NEW AFRICAN BEES.

By T. D. A. COCKERELL.

THE bees described below were collected in the interior of Portuguese West Africa, in the same general locality as those previously reported.

Thrinchostoma wellmani, sp. nov.

♀. Length about 12 mm.; anterior wing 9 mm.; black, with short greyish-white pubescence; antennæ dark, ordinary; ocelli close together; front finely punctured; sides of face with silvery hair; malar space longer than broad; clypeus produced as usual, with sparse strong punctures; maxillary palpi six-jointed, third joint short and thick, last long and slender; labial palpi four-jointed, the first longest; tongue long and slender, as is usual in the genus; mesothorax and scutellum dull, densely and minutely rugosopunctate; area of metathorax coarsely granular; sides of metathorax with white tomentum; pleura with coarse white hair; wings ample, dusky, the apical margin broadly fuscous; stigma and nervures dark sepia; b. n. falling short of t. m.; first s. m. longer than third; second large and nearly square; first r. n. reaching extreme base of third s. m.; third t. c. with a double curve; t. m. bent; tegulæ shining piceous, with a

large pallid spot in front; legs black, including the tarsi, abdomen black, the hind margins of segments 2 to 4 broadly whitish, and with fine silvery hair on third and fourth.

Hab. Benguella, "found dead" (Wellman, 1474). The genus *Thrinchostoma* was founded on a species from Madagascar; but a second species, *T. productum* (*Halictus productus*, Smith), is known from Sierra Leone and the French Congo. *T. productum* is readily known from *T. wellmani* by its smaller size; the female (according to Vachal) being $8\frac{1}{2}$ mm. long, with the anterior wing $6\frac{1}{2}$ mm. *Diagozonus bicometes*, Enderlein, from the Cameroons, is also closely related, and it is a question whether the genus *Diagozonus* should be maintained. Enderlein himself states that *Halictus productus* appears to belong to his genus, apparently overlooking *Thrinchostoma*; but, nevertheless, there are some characters in the wing of *Diagozonus* which may perhaps entitle it to recognition as a valid genus.

Nomia amabilis, sp. nov.

♀. Length nearly 14 mm., anterior wing a little over 10; black, robust, with the pubescence partly dull white and partly black; abdomen with broad but very widely interrupted (the middle third missing) light sky-blue tegumentary bands on the first four segments; scutellum prolonged into a backwardly-directed lobe on each side; postscutellum W-like, with two prominent but obtuse angular projections. Head broad, with much white hair; clypeus dull, striatulate-granular, with a faint rather shining median ridge; antennæ dark, but the fifth joint orange-ferruginous beneath; flagellum rather thick; mesothorax dull and densely punctured, with black hair, except at the sides; pleura, tubercles and sides of metathorax with copious white hair; tegulae large, black; wings very dark, nervures and stigma black; legs black, with the hair partly black and partly white, but orange-ferruginous on inner side of basitarsi, especially the last; hind tibiae with the hair black on outer and yellowish-white on posterior face; middle tibiae with the hair of basal half of outer face mostly white, and of apical half mostly black; anterior tibiae with the black confined to the apical fourth; abdomen above with scanty black hair; fifth segment covered with orange-ferruginous hair, with some black bristles overlapping; apex with black hair.

Hab. Benguella, "flying near a house" (Wellman, 1469). This agrees in the structure of the scutellum and postscutellum with *N. scutellaris*, Sauss., from Madagascar; but differs by the very dark wings, and the beautiful blue markings of the abdomen. Friese has described two forms of the *scutellaris*-group from the African mainland: *N. maculata* (Friese) and *N. nigripes* (Friese). These differ from *N. amabilis* in having the abdominal markings reduced to quadrate spots on each side, of a bluish-white colour; while the wings are only moderately dark, as in *scutellaris*. From the blue markings on the abdomen, *N. amabilis* looks at first sight like a *Crocisa*.

Mesotrichia orthosiphoms, sp. nov.

♀. Length about 16 mm.; anterior wing about 14, width of abdomen about $8\frac{1}{2}$; face between the eyes about 4 mm. wide. Black; the thorax above, the upper third or less of pleura, the first abdominal segment above, and a patch in the middle of the second, all covered with canary-yellow hair; face with dull white hair, with black intermixed; cheeks with white; vertex with black and whitish mixed; flagellum clear red beneath, except at base; frontal keel between the antennæ distinct but not high; clypeus with strong punctures, and a median smooth line; pleura, except the upper part, with dark fuscous hair; tegulæ ferruginous; wings with the basal half hyaline, the apical strongly reddened, with a purple (not at all green) lustre; legs with black or brown-black hair; sides of abdomen fringed with black hair; extreme apex with a little tuft of ferruginous hair. A species of the group of *M. modesta*, Smith, distinguished by its very broad form, the mixed light and dark hair on face, and the yellow patch on the second abdominal segment. From *M. anicula*, Vachal (which I have from Dr. Brauns), it is easily known by its broader form, and paler, strongly reddish wings.

Hab. Benguella; at flowers of a species of mint of the genus *Orthosiphon* (Wellman, 1473).

ON MOUNTING COLEOPTERA.

By H. F. FRYER, F.E.S.

It is with some hesitation I submit the following notes on mounting. To the old coleopterist there is probably nothing in them he does not know, and the practised hand will produce good work by many different methods; still, when I remember my early difficulties, and the awful objects I produced—some of which, species I have not met with again, still stare me in the face—and contrast this former state of things with the comparative ease with which a beetle is set up now, I am tempted to hope that some beginner may have his labours lightened by the hints given below, possibly some waverer confirmed in his faith, and, maybe, some collector induced to take up the study of this most fascinating order, members of which occur nearly everywhere, even in the most unlikely places, and which can be collected throughout the whole year.

Killing.—As far as my experience goes, the best method of killing specimens for mounting is by plunging them for a few seconds in water which is near the boiling point. An ordinary ringed stand, used in chemical work, a small spirit-lamp, and porcelain dish or crucible, is the most convenient apparatus, and is ready for use five minutes after the lamp is lighted.

The great advantage of this method is that the extinction of

vitality is immediate, so that species with retractile tendencies, such as *Saprinus*, *Byrrhus*, the *Rhynchophora*, and many others, which, when killed with laurel-leaves, cyanide, or ether, take some days to relax, and are never easy to set, when plunged in hot water die with their legs more or less extended, and if set at once do not present any great difficulties. If not set at once, *rigor mortis* sets in, and they must then be left from thirty-six to forty-eight hours until this has passed off. In this case they are best kept in a box, which also answers the purpose of a relaxing-box; at the bottom of one of the ordinary tin tobacco-boxes, which have a habit of accumulating in some houses, place a piece of the entomological peat, supplied by dealers in entomological apparatus; on this place two or three thicknesses of white blotting-paper, and saturate the whole with a weak solution of carbolic acid (1 in 40) to prevent the growth of mould; afterwards it can be simply damped with water when necessary. The specimens can be laid directly on the blotting-paper, but I find it more convenient to place them between the folds of an old pocket-handkerchief folded in book form and stitched at the back; the captures of different days and divers localities can then be more easily kept separate, and, moreover, can be successively dealt with as they become in a proper state of relaxation for setting.

Unfortunately the hot water method cannot be easily used in the field on a long day's excursion, when many species are taken, and as it is troublesome to keep separate the rapacious species, the insects must be killed on the spot, and the collector has his choice between laurel-leaves, cyanide of potassium, and possibly ether. After trying each, I have returned to the first-named, but the laurel-leaves must be finely shredded and renewed fairly often, though when stale they can be freshened up with a few drops of ether, the effect of which will last for a day. Laurel-leaves have the great advantage of keeping the insects relaxed for almost any length of time, and by using several bottles those from different localities can be kept separate without trouble. One disadvantage of laurel-leaves must be mentioned, and that is if the specimens are left for a lengthened period there is some danger of grease; but I have found that if the leaves are perfectly dry before they are used, this rarely occurs. It is hardly necessary to describe the well-known "beetle-bottle." I use the bottles in which the tabloids of *Cascara sagrada* are sold, and through the cork bore a hole with a cork-borer to take a piece of glass-tubing about 9 mm. in diameter—the larger the tube the cork will bear the better; the tube should project about $1\frac{3}{8}$ inches above and one inch below the cork, and should itself be fitted with a small cork made from the core from the boring, this small cork should be tied with fine twine to an elastic band round the neck of the bottle to prevent loss; it is only necessary then

to transfer this tubed cork from one bottle to another as occasion requires.

The Support.—Never stick a pin into any beetle if you can avoid it is a good maxim—in other words, mount all except the very largest species on cards; *Carabus*, *Dytiscus*, and *Lucanus* may, I suppose, be pinned, but I would rather have them on cards. Choose a thick card, as it does not buckle, and is firmer on the pin. Decide on about four standard sizes, and do not vary from them; a series well mounted on cards of the same size and at the same height on the pins is a thing of beauty, but on cards of different sizes and at different heights is a disgusting sight—I have many of them, I regret to say, put up in my inexperienced days.

Following the plan adopted in many museums, I have punches made of the four standard sizes, but these are not really necessary, as with a pair of compasses, a flat ruler, and a pencil, the cards can to all intents and purposes be cut the same size, but it is necessary to keep a card accurately ruled as a gauge.

One has now to decide whether to join the long card or short card brigade. A long card placed at the top of a long pin has, I think, the best appearance, but the extra room required is a great drawback, and unless one's cabinet is a forty-drawer one, I should advise the adoption of a short card placed at the top of a "point," i. e. a pin without a head, there is nothing then to interfere with the use of a powerful short focus lens. I use a Steinheil magnifying eight times, and one magnifying twelve, but with the former the characters of nearly all species except the smallest can be made out, and it is seldom necessary to employ a compound microscope.

(To be continued.)

DESCRIPTION OF A NEW SPECIES OF *MEGACHILE* FROM INDIA.

By P. CAMERON.

Megachile nicerillii, sp. nov.

Black; the head and thorax covered with snow-white pubescence, the dorsal abdominal segments with similar pubescence, the scopa snow-white; wings hyaline, the nervures and stigma black; the first recurrent nervure received two-thirds of the length of the first transverse cubital nervure from the latter, the second clearly separated from the second transverse cubital. Mandibles bidentate, the apical tooth longer than it is wide at the base, gradually narrowed towards the apex, which is rounded; the second broad, bluntly rounded. ♀. Length, 7 mm.; breadth, 2 mm.

"India" is the only locality I have for this species.

Head, pro- and mesothorax closely, somewhat strongly, punctured; the post-scutellum and metanotum smooth, shining, bare. Head a little wider than the thorax; the clypeus wider than long, its apex transverse. The pubescence on the face and front is long and dense. Abdomen not quite so long as the head and thorax united, the basal four segments shining, distinctly but not very closely punctured, the last opaque, much more closely punctured, its apex with a broad white hair-band. Except on the under side of the tarsi, where it is tinged with rufous, the hair on the legs is white; the calcaria white, the posterior darker coloured than the others. The second abscissa of the radius is not much longer than the first.

Of the Indian species known to me the present comes nearest to *M. elfrona*, Cam., which may be known from it by the opaque, aciculated, almost punctured metanotum, by the first recurrent nervure being received nearer the transverse cubital, and by the rufous tarsi.

NOTES AND OBSERVATIONS.

TRICHOPTILUS PALUDUM Z. IN EAST DEVON.—Whilst collecting last September in East Devon, I took several specimens of a small plume-moth, which subsequent investigation proved to be *T. paludum*. It was flying in the afternoon over a boggy piece of ground, and its short flight of about a yard, from tuft to tuft of stunted heather, made it difficult to see. The most westerly record given in Barrett's 'Lepidoptera' is Dorset, but the species evidently exists over the borders of this county.—ARCHIBALD SHARPIN; Bedford, March 14th, 1908.

EXAMPLE OF PROTECTIVE MIMICRY IN MALE HEPIALUS HUMULI.—On July 16th, 1907, whilst walking in one of the lanes near here, I was struck by the large quantity of "Cuckoo spit" on the grass which was growing on the lane side, and was led to make a closer examination. To my surprise, I found that several of the white lumps that I had thought in the first instance to be "Cuckoo spit" were in reality males of *Hepialus humuli*, which were clinging to the grass stems with the wings folded along the body. This appears to me to be clearly a method of protection, and the idea is emphasized by the fact that the moth was only to be found where the "Cuckoo spit" was. This example of the protection of *H. humuli* was entirely new to me.—G. GIBSON-ROBERTSHAW; Gordon Bank House, Luddenden Foot S.O., Yorkshire.

LYCÆNA ZEPHYRUS var. LYCIDAS.—Referring to Mr. Prideaux' article in the March number of the 'Entomologist,' I note that the above butterfly was taken in a "slightly ragged" condition at Bérissal as early as June 15th. It may be interesting to mention that in 1886, about August 15th, I took two perfect specimens of the female on a high grassy plateau of the Gemmi just before commencing the ascent of the Pass. The altitude would be about the same as that of Bérissal; this capture therefore may be considered a striking

confirmation of the "very prolonged period of emergence" to which Mr. Prideaux refers. I was living at the time in Dresden, and on my return I took the two specimens out to Blasewitz for Dr. Staudinger's inspection. He pronounced them to be undoubted *Lycidas*, and said that the locality was to him a new one. I had taken a rather worn specimen of the male in the valley between Stalden and Brigue at the end of July the year before.—R. S. STANDEN, F.E.S.; Lindfield, Sussex, March 7th, 1908.

BIRD CHASED BY A BUTTERFLY.—One day while I was collecting in the Bered Woods at Durban I was much interested to see a specimen of *Papilio lyæus* in hot pursuit of a bird; he was chasing it in exactly the same manner that many of these big *Papilios* will sometimes chase away other butterflies from their own immediate neighbourhood, and the bird, which was about the size of a large blackbird, was flying rapidly before his pursuer, showing every symptom of fear and trepidation, while the butterfly continued to pursue the intruder for some distance, before returning to his former perch. Most collectors will doubtless have occasionally seen a bird pursuing a butterfly (though generally without effecting its capture), but I should be interested to know if anyone has ever before observed the relative positions reversed.—(Miss) M. E. FOUNTAINE, F.E.S.; Durban, Natal, December, 1907.

SYMPETRUM VULGATUM.—Referring to the inquiry (*antea*, p. 39) relating to *Sympetrum vulgatum*: whilst I cannot, of course, give any information as to the locality from which Mr. Harrison obtained the specimen referred to, I can report that he was a most reliable man, and accomplished some good natural history work in this district. In 1835 he took an active part in connection with the British Association Meeting at Hull, and we have many evidences in this museum of his reliability.—T. SHEPPARD; the Municipal Museum, Hull, March 24th, 1908.

ENTOMOLOGICAL SOCIETY OF LONDON.—The First Commissioner of H. M. Works having kindly placed the Theatre, Great Hall, and other rooms of the Civil Service Commission at Burlington Gardens at the disposal of the Society, the *Conversazione* will be held there on the evening of Friday, May 15th, and not as previously announced to Fellows. Full particulars will be published during the current month, and intending exhibitors are requested to communicate with the Honorary Secretary, H. Rowland-Brown, 11, Chandos Street, Cavendish Square, W.

CAPTURES AND FIELD REPORTS.

EUPITHECIA INNOTATA NOT IN WORCESTERSHIRE.—My note (Entom. xl. p. 40) on the above insect having been taken by me here having been questioned by Mr. Eustace Banks, I submitted the insect to his kind inspection. He tells me that although my specimens might be referred equally well either to *innotata* or *fraxinata* (assuming that these are distinct species, which is open to argument),

the occurrence of the former so far inland is decidedly improbable, and the proximity of an ash tree to my house further justifies the assumption that the individual is *fraxinata*. I have therefore placed it accordingly.—ARCHIBALD DAY; The Vicarage, Malvern Links, March 22nd, 1908.

NOTES FROM THE NORTH-WEST (continued from p. 66).—On the *davus* locality in the Delamere district we counted eight rather worn specimens of this butterfly on the 20th. The ground is now protected by gamekeepers, but whether or not their advent will restore the butterfly to its former numbers remains to be seen. Other heath and fir insects were observed as *L. ægon* (not so plentiful as in 1906), *Nemeophila russula*, *Ematurga atomaria*, *Bupalus piniaria*, *Aspilates strigillaria*, *Macaria liturata* (with the dark form *negrofulvata*), *Crambus margaritellus*, and *Pleurota bicostella*. *V. urticae* and *Epinephele ianira* were numerous and fresh, and many *L. quercus* males were dashing about. For the first time in my experience of the Delamere district I found a larva of *Saturnia carpinii*.

On July 21st seven males and one female of *Scodiona belgaria* were taken on the Denbighshire hills. The remainder of the month was made up of cool, unsettled weather, and "the coldest July on record" ended on the 31st.

August 1st was a fine day in Denbighshire, and fairly warm and sunny. Starting in the morning with Mr. J. Thompson, we had an enjoyable ramble of some twenty miles over the mountains from Wrexham to Llangollen. A male *L. quercus* was seen—attracted by a perforated zinc box which had contained a virgin female. A very dilapidated female, which had laid its eggs, was picked off the heather and then set at liberty. Some specimens of a dull form of *Agrotis porphyrea* (*strigula*) were netted. Other Lepidoptera were pale and type forms of *Larentia didymata*, *Crambus culmellus*, *Aphelia ossana*, and the pretty little tortrix *Eupacilia angustana*. A *Scoparia* was also common on the heather, and as I had taken the same species in Delamere Forest in July, and on Arnside Knott, North Lancashire, in August, 1906, I sent specimens to Mr. Eustace R. Banks, who kindly identified them as *S. ambigua*. A large grey spider (*Epeira diademata*) with brown, blotched markings was taken from its geometrical mesh. I kept it alive on a piece of heath for three months in a glass jar, where it at once constructed another mesh regardless of the fact that no flies could enter through the net covering. It was supplied daily with house flies, and it was interesting to note that it only seized its prey when the latter struggled in the mesh. Other flies often brushed close past, and even touched the spider, but were never seized. In fact, the whole was an exhibition of how instinct ends and reason never begins. Its power of sight did not appear to extend beyond an inch or two, and the sense of hearing seemed supplanted by a keen sense of vibration. At the end of the three months I handed it over to a member of our "Society of Natural Science, Literature and Art," which, by the way, was founded by Charles Kingsley, and now numbers over a thousand members.

As we sat eating our lunch on the top of Minera Mountain it was

interesting to watch "Daddy Long Leg" females (*Tipula oleracea*) depositing their eggs at the roots of the short, carpet-like grass. Their bodies, with their ovipositors, were kept vertically bobbing up and down, and the long legs were useful in keeping the wings clear of the grass.

A few larvæ of *S. carpini* were boxed, and three unknown others, apple-green, with a silvery-white spiracular line, a thinner silvery-white dorsal line, segment divisions white-yellow—altogether very suggestive of the genus *Polia*. Some nettles which a fortnight ago had feasted swarms of *V. io* caterpillars were found deserted, but as usual not a chrysalis was to be seen anywhere.

Descending into the lovely Vale of Llangollen at dusk, and past the Eglwysig Rocks, viz. the *ecclesiastical rocks*, because belonging to the dismantled Abbey of the Vale of the Cross (Abbey Crucis) hard by—these rocks are famous in the history of *A. ashworthii* as the place of discovery in 1853, by Mr. Joseph Ashworth—we netted *Udaria aversata*, including the dark-banded form *C. fulvata*, *Camptogramma bilineata*; and *Hyppena proboscidalis* was such a nuisance that darkness was almost welcomed as putting an end to the annoyance.

On the hills in Denbighshire, where the carboniferous limestone crops out, *L. agestis* was just appearing on August 10th. Two *L. alexis* were netted, and numbers of worn *E. ianira* and *C. pamphilus* were observed. *Anaitis plagiata* and *E. mensuraria* were plentiful among the short furze and heather. A specimen of *Hecatera serena* was taken at rest on a stone wall. The usual breakdown in August weather took place on the 12th, and from that date to the end of the month the time at my disposal was chiefly spent in looking for larvæ. What I take to be caterpillars of *H. serena* were common locally near Chester, on flowers of hawkweed and cats'-ear; and numerous *Dicranura vinula*, *Smerinthus populi*, and *S. ocellatus* were observed on poplars or willows. Since a great deal of the ground on which the willows grew is under water throughout the winter, the pupæ of the last-mentioned species must consequently be drowned—another case of instinct *versus* reason. From the 19th to the 24th, the mean daily maximum temperature in London was only sixty-three degrees—nine degrees short of what is normally due in August. The low general temperature of the month, with frequent rains, sent thousands home from the seaside.

Autumn opened on September 1st, with a fine, calm, sunny day, but the remainder of the week was one of winter and rain-storms from the north-west. Two degrees of frost were registered near Chester on the 4th, instead of the temperature of last year which approached ninety degrees. Snow fell in North Wales and in Scotland. The Snowdonian Range was snow-capped, and Ben Nevis was white to a distance below the summit of 2000 feet. Entomology seemed at an end for the season, when, contrary to expectation, the remaining three weeks of the month were, for the British Isles, an Indian summer. But, in a favoured haunt, where there had been scores of *L. alexis* in 1906, there were only four males and one female observed of the autumn brood. At ten o'clock on the night of the 8th, I came upon a small caddis-fly clearing a bud of a Gloire de Dijon

rose of aphides. In a few minutes every aphid was devoured except a male, which, upon being attacked, took to flight, as also did the caddis.

Moths appeared again at the electric lamps, and on the 16th I got a male and female *A. ugathina*. Curiously enough this was one of the few unrepresented species in my collection of Macro-Lepidoptera, and I was uncertain of my captures until they were confirmed by Mr. South.

The 25th was the warmest day of the season since May 11th, the thermometer registering eighty degrees in the shade and one hundred and eighteen degrees in the sun. The month closed with a falling barometer. It was interesting to note that while the United Kingdom was enjoying an Indian summer, Newfoundland, Spain, Portugal, and France were smitten by storms of terrific violence. The tornado with its downpour reached as far south as Casa Blanca on the Moorish coast of Africa, the French camp being wrecked on the 26th.

Very little entomology could be done in October. As predicted by the barometer the 1st was a day of rain, but, from that date to the 6th, the weather improved and it was fine, warm and sunny on the whole. *A propos* of spiders it was interesting to read that the airship "Nulli Secundus" met with "cobwebs, high up" in its ascent on the 5th, and that the balloon was afterwards found to be covered with them. I am not aware that the appeal to scientists for an explanation met with a response, but the cobwebs were doubtless gossamers or spider's threads, which float in the air and, especially in a dry atmosphere, rise to a considerable height, travel long distances on the breeze and distribute the spiders' young. A similar case of insect distribution is seen in the Woolly Aphis (*Schizoneura lanigera*) on apple trees, with its white cottony secretion enabling the young Aphides to travel with the winds from tree to tree. The lowest London temperature on October 8th was forty-six degrees—only one degree warmer than Lapland, and the remainder of the month was unusually cold and wet. The usual autumn moths—*Hydræcia micacea*, *Anchocelis pistacina*, *Phlogophora meticulosa*, *Aporophyla lutulenta*, *A. nigra*, *P. gamma*, *Ennomos tiliaria*, *E. fuscantaria*, *Hybernina defoliaria*, *Cheimatobia brumata*, with an occasional *Pacilocampa populi*, *Cirrhædia xerampelina*, and *Dasyptolia templi*—appeared at the electric lamps, but in diminished numbers.

November is often an enjoyable month, but calm, sunny days were absent in 1907. On the 25th snow fell in Cumberland, North Wales, Shropshire, and Lincolnshire. Larvæ of *Boarmia repandata* began hibernating as early as the 20th of October. They do not move from the position taken up under dead leaves, &c., until early spring. Larvæ of *A. nebulosa*, on the contrary, often woke up in the inclement December, and indeed throughout the winter, wandered about their cages, and even ate a little dock.—J. ARKLE; Chester.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, March 4th, 1908.*—Mr. C. O. Waterhouse, President, in the chair.—Major E. F. Boecher, of 2, Berkeley Villas, Pittsville, Cheltenham; the Rev. K. St. Aubyn Rogers, M.A., of Rabai, Mombasa, British East Africa; and Mr. Claude Rippon, M.A., of 28, Walton Street, Oxford, were elected Fellows of the Society.—The decease of Mr. Herbert Goss, F.L.S., for many years a Secretary of the Society, was announced in a sympathetic speech by the President.—Mr. F. B. Jennings exhibited a specimen of the weevil *Phyllobius maculicornis*, Germ., retaining both the “false” mandibles, and another in which one of them is intact, both from Enfield; also a single example of *P. urticae*, De G., from Cheshunt, retaining one of these appendages, the particular point of interest in connection with these examples being that the “false mandibles” were toothed in the centre; also a remarkable specimen of the common Chrysomelid beetle, *Sernyla halensis*, L., from Deal, showing unusual coloration of the elytra, which were blue and coppery-red, instead of bright green; and on behalf of Mr. C. J. Pool, a specimen of *Otiorrhynchus tenebricosus*, Herbst, from Newport, Isle of Wight, and of *Barynotus obscurus*, F., from Galway, Ireland; in the first of which both the pupal mandibles were toothed, and not in the second.—Mr. H. St. J. Donisthorpe brought for exhibition *Otiorrhynchus sulcatus*, *Polydrusus sericeus*, and *Osmius bohemannii* with pupal mandibles. The *Otiorrhynchus* was dug up in its pupal cell at Oakham in 1905.—The Rev. G. Wheeler showed a case containing specimens of Melitæid butterflies taken by him at Reazzino in Tessin, near Bellinzona, which he had identified with Assmann’s *Melitæa aurelia* var. *britomartis*, they being absolutely identical with the specimens so labelled in the Swiss national collections at Berne. The close affinity with *M. dictynna* made separation superficially very difficult, and until all forms were reared from the ovum it would be impossible to determine whether *britomartis* constituted a separate species or not.—The following papers were communicated:—“Descriptions of New Species of Lepidoptera-Heterocera from South-East of Brazil,” by H. Dukinfield Jones, F.E.S.; “*Erebia lefebvrei* and *Lycena pyrenaica*,” by Dr. T. A. Chapman, M.D., F.Z.S.; “A Contribution to the Classification of the Coleopterous Family Dynastidae,” by Gilbert J. Arrow, F.E.S.; “Hymenoptera-Aculeata Collected in Algeria by the Rev. A. E. Eaton, M.A., F.Z.S., and the Rev. F. D. Morice, M.A. Part III., *Anthropila*,” by Edward Saunders, F.E.S.

At the Special General Meeting adjourned from February 5th, the proposal to raise the Life Composition from £15 15s. to £21 was rejected by a majority of three votes.—H. ROWLAND-BROWN, M.A., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*February 13th, 1908.*—Mr. A. Sich, F.E.S., President, in the chair.—Mr. R. Adkin exhibited a bred series of *Anticlea rubidata* from Devonshire, and called attention to the pale olive-brown forms

as not occurring elsewhere.—Mr. South, a bred series of *Larentia olivata* from Torquay, two of which emerged on June 4th, 1907.—Mr. Tonge, a female example of *Melanippe fluctuata* taken on February 12th at Portsmouth, and a female *Hybernia rupicaprariva*, and called attention to the peculiar droop of the wings in its resting attitude.—Mr. Step, a butterfly set up between two pieces of glass, for use by students of art schools.—Mr. Rayward, the hibernating larva of *Aricia agestis* (*Lycena astrarche*).—Mr. Newman, a varied series of *Nemeophila plantaginis* from Aberdeen, an extremely light *Mellinia gilvago*, two *Hylophila prasinana* with very indistinct lines, a rayed variety of *Melanippe sociata*, and a broad-banded form of *Mesotype virgata* (*lineolata*).—Mr. Colthrup, species taken at ivy in the New Forest in 1907.—Mr. Turner, eight species of *Pyrilidæ* taken in Canada last year by Mr. L. B. Prout, including *Evergestis straminealis*, and read notes on the forms and the distribution of each. He also showed examples of several British species of *Pyrilidæ* from Syria, including *Pyrilis costalis*.—Dr. Hodgson, a long series of *Agriades* (*Lycena*) *bellargus*, showing the colour variation obtainable in the species. They were selected from 1904 to 1907 in various parts of the North and South Downs. He pointed out the five distinct shades of blue, and gave notes on the markings and on the aberrations obtained.—Mr. Fremlin read a paper entitled "The Effect of Physical and Chemical Agencies on Lepidoptera, being the Results of Experiments made in 1906-7," and a discussion took place.

February 27th, 1908.—Mr. A. Sich, F.E.S., President, in the chair.—Mr. Edwards exhibited specimens of *Papilio lampsacus* and the rare *P. priapus* from Java.—Mr. Rayward, the ova of *Miselia oxyacanthæ* in situ on twigs of hawthorn. All were solitary, except in one instance of two ova.—Mr. Pratt, a larva of *Geometra vernaria* which had passed two winters in that stage.—Mr. Newman, living melanic females of *Hybernia leucophaæaria* from Bexley, and a bred melanic form of *Larentia multistrigaria* from Huddersfield.—Mr. Sich, a transparent m.m. and c.m. measure for obtaining the alar expanse of insects.—The rest of the evening was spent in the exhibition of lantern slides, among which were the following entomological subjects:—Mr. Tonge, slides of lepidopterous ova, larvæ, cocoons, pupæ, and imagines; Mr. Main, slides showing the osmateria of *P. machaon*, and various larvæ and pupæ.—HY. J. TURNER, *Hon. Rep. Secretary*.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—February 18th, 1908.—Annual Meeting.—At the nineteenth Annual Meeting of this Society it was resolved to dissolve the Birmingham Entomological Society, and to hand over its assets, &c., to the Birmingham Natural History and Philosophical Society, with the idea of forming an entomological section of that Society.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—February 4th, 1908. Mr. L. W. Newman exhibited *Halkias prasinana*, with inner line on fore wings obsolete, and outer nearly so; also *Eubolia lineolata*, with white band very broad and much accentuated and extended round hind wings.

March 3rd.—Mr. S. J. Bell, *Gnophos obscurata* from various localities, including examples from North Cornwall (near Bude), as dark as the New Forest form.—Dr. T. A. Chapman, microscope slides of ova of *Iodis vernaria*, showing that the surface consisted of a collection of hexagonal cells each with a central knob. *A propos* of this exhibit Mr. L. W. Newman stated that he had frequently noticed a sweet scent when opening boxes containing ova of this species.—Mr. A. W. Mera, *G. obscurata*, a pale speckled form from Freshwater.—Mr. V. E. Shaw, *G. obscurata* from many localities, including sandy-coloured specimens from Babbicombe.

March 17th.—Dr. H. C. Phillips, a specimen of *Acronycta aceris*, darker than the London form of *A. psi*, from Kensington Gardens; also from same locality a series of *Ennomos angularia*, including female with the two lines on fore wings accentuated and close together; long series of *Cidaria immanata* and *C. russata* were shown by many members, these species being the subject of the paper to be read by Mr. L. B. Prout; the latter's series included melanic *C. russata*, from Wolverhampton, and specimens from America attributed to this species but proved by the genitalia to be distinct.—*Hydræcia nictitans* and *paludis*. Rev. C. R. N. Burrows exhibited drawings of the genitalia of *nictitans* and of *paludis*, generally known as the marsh form of *nictitans*. The exhibitor claimed that these showed differences in structure which entitled *paludis* to specific rank.—S. J. BELL, *Hon. Sec.*

THE ENTOMOLOGICAL CLUB.—A meeting was held at Wellfield, Lingards Road, Lewisham, on March 19th, 1908, Mr. Robert Adkin in the chair. Other members present were Messrs. H. St. J. K. Donisthorpe, T. W. Hall, and G. T. Porritt. There were also eleven other guests, among whom were three hon. members—Messrs. H. Rowland-Brown, A. Sich, and E. A. Smith. The chairman announced that, in consequence of the regrettable death of Mr. A. Chitty, a vacancy occurred in the membership, and that this should be filled up at the next meeting. Mr. Donisthorpe proposed Mr. Rowland-Brown as a member of the Club, and this was seconded by Mr. Porritt. The nomination to be brought forward at the next meeting.—RICHARD SOUTH, *Hon. Sec.*

RECENT LITERATURE.

Additions to the Wild Fauna and Flora of the Royal Botanic Gardens, Kew: VI. (Bulletin of Miscellaneous Information, No. 10, 1907).

The present short list comprises the Orthoptera and Neuroptera, and a few Hymenoptera and Coleoptera, submitted to Mr. W. J. Lucas, B.A., since the publication of 'Bulletin, Additional Series V.' The list is illustrated by a plate of cockroaches—*Nauphæta brazzæ*, *N. cinera*, *Blatta orientalis*, and *Leucophaea surinamensis*. The list is followed by a note by Mr. Watson on the harm done by cockroaches at Kew.

NEWLY-HATCHED LARVA OF PAPILIO HOMERUS, - 123.

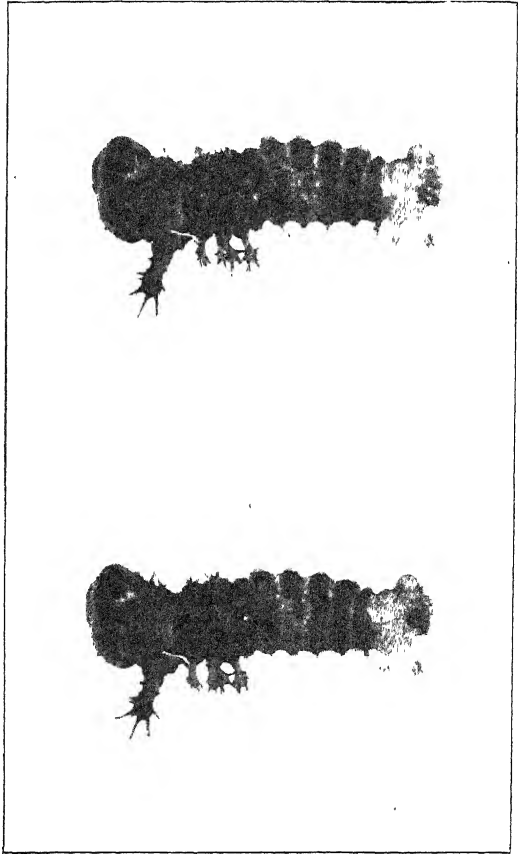


Photo A E Tonge

EGGSHELLS OF PAPILIO HOMERUS, - 10

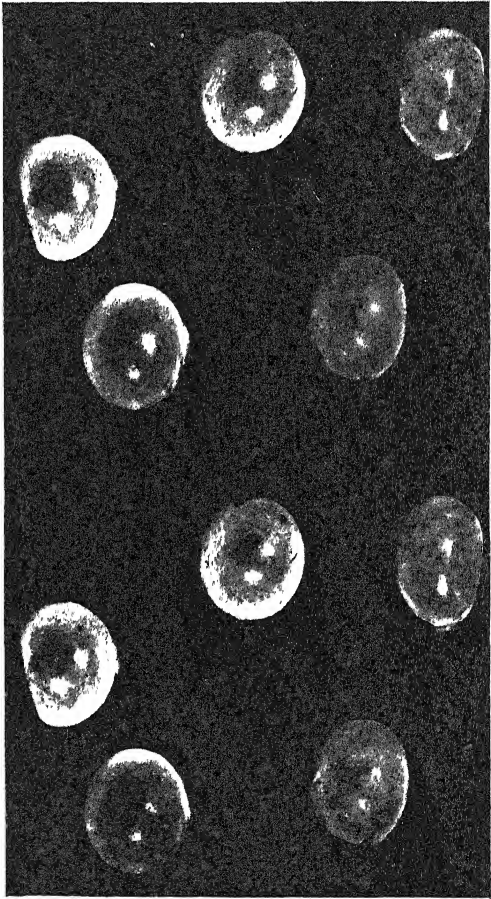


Photo A E Tonge

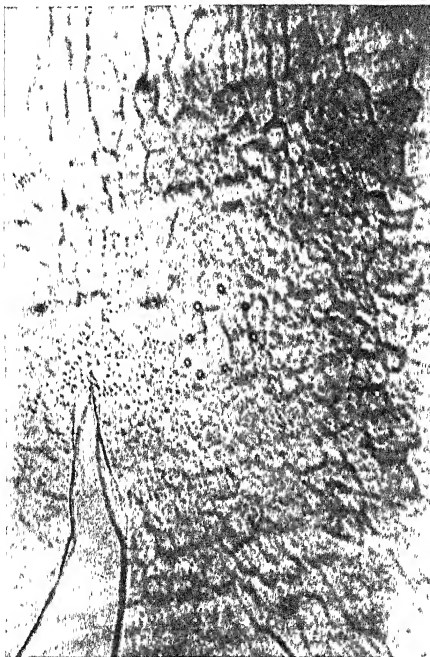


Photo F N Clark

MICROPYLE OF THE EGG OF PAPILIO HOMERUS.

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ON THE EGG AND FIRST-STAGE LARVA OF *PAPILIO HOMERUS*, FABR.

By T. A. CHAPMAN, F.E.S.

(PLATES III.-V.)

THE egg and young larva of this butterfly are described by Gosse in the Proc. Ent. Soc. Lond. for 1879, p. lv, and the full-grown larva and pupa in the 'Transactions' for 1894, p. 409, but no figures at any larval stage are, so far as I know, available.

It is, therefore, with some satisfaction that I am able to give a figure of the newly-hatched larva from stereoscopic photographs by Mr. A. E. Tonge, F.E.S. This larva is not so eccentric as a young *Papilio* as it was regarded by Gosse. The full-grown larva, like that of most *Papilios*, is without hairs or spines; Gosse's remarks were no doubt due to expecting the newly-hatched and full-grown larva to be similar.

This young larva would be very remarkable were it that of a *Papilio* larva in the last stage. Though it is, so far as I know, very unusual in the high pillars on which the bristles are mounted, it is not essentially very different from the first-stage larva of, say, *cresphontes*, as figured by Scudder.

Mr. G. R. Baldock, F.E.S., handed me some eggs of *Papilio homerus*; they were found in the envelope with a female *P. homerus* in paper, attached to the end of the abdomen. The datum on the envelope was June 7th, Mooretown, Jamaica. Several of the eggs contained dead larvæ, which had eaten holes in the shells, but had not succeeded in escaping. There was one larva dead and shrivelled that was free.

The eggs were more or less fastened together and smeared with a glutinous substance, most abundant about the base of the egg. I imagine that if the eggs had been laid naturally it would

have been confined to the base of the egg, and was, in fact, the cement for fastening the egg to a leaf, or whatever is the proper place on which the butterfly fixes it. The eggs being laid in a bunch in a confined space, the result is the general dissemination of the cement. The eggs are almost exactly spherical, except for a flat basal area, diminishing the height of the egg by about one-sixth; an egg 1.8 mm. across is 1.5 in. high. The egg-shells are whitish and slightly rough, with no special structure; this is, however, probably due to the cement smeared over them. When damp they are transparent, and the larva inside, when alive and filling the shell, was no doubt quite visible inside it, coiled up. The egg is a very large one, the diameter being 1.8 to 1.9 mm.

In a mounted portion of the shell the micropyle is a little patch of very small cells, with centrally eight black dots (pores). The blackness of the dots is merely a refractive effect, as the focus can be altered so as to make them brilliant points. In the immediate neighbourhood of the dots the cells are approximately hexagonal and 0.01 mm. in diameter; at 0.1 from the centre they are about 0.015; at 0.15 they are radially elongated, about 0.015 across and 0.03 long; at .25 from the centre they are about 0.04 long. One or two can be barely made out at 0.3 mm. from centre, about 0.03 mm. wide and 0.06 long; beyond this no traces of cellular structure can be seen. The shell generally is finely granular. The appearance conveys to me—I cannot quite say how—a suspicion that these granules belong to an adventitious coat (of cement?), but this can hardly be the case regarding their very uniform size and general distribution; each granule occupies a space of about 0.0025 mm. across. The result of certain scratchings and scrapings of another portion of egg-shell leads me to conclude that these granules are adventitious, but not from misplaced cement; possibly they are some portion of embryonic membrane, as they appear to be rather on the inner surface of the shell.

P. homerus larva at hatching is 5.0 mm. long, head 1.2 mm. wide; head dark brown, dorsum fuscous-brown to seventh abdominal segment; sides of thorax pale, with slight fuscous shades, second to seventh abdominal segments rather lighter than first and thoracic dorsum; these segments are all similarly coloured and marked. The eighth, ninth, and tenth segments are colourless, and notwithstanding the other colourless areas stand out as conspicuously white. The most notable feature of the larva, however, is the groups of hairs raised on great bosses—almost horns on the prothorax—and less ones on the three following segments, and on the eighth and ninth abdominal.

The dark dorsum results from a series of dark lozenges towards posterior border of segments, especially large on second thoracic, and of arched marks on each side of these, and on

some segments meeting in front of them. There is a rather paler stripe just below these (subdorsal) containing one dark mark. Laterally the dark area from subdorsal to low subspiracular is partially broken by light markings into three parallel stripes, and these a little broken on each segment.

The brown head has four ocelli in a curve, with convexity forwards, and one (making five) about the centre of the curve behind. The base of antenna is pale, as well as the soft portions of the mouth-parts. There is a paler area at the vertex laterally. The first antennal joint is an extremely narrow line of brown chitin, easily overlooked. The second is conical, flat at each end, nearly half as long again as broad at the base, more than twice that of apex. It carries on front side a short thick hair, and close to or on the end what must be called a hair, but is a broad thick process, little longer than broad; at end is a third joint, a short process as broad as long, with several hairs or sensitive papillæ at end; also on second joint, and beside this, are two conical (jointed at base) papillæ, and one minute hair. The labrum is 0.5 mm. wide, deeply notched so as to be 0.22 mm. long (antero-posteriorly) at ends, 0.17 in the middle. It carries outside five bristles (on each side), longest nearly 0.1 mm. long; inside it has on each side one long median hair and a row of six very thick bristles (0.05 mm. long) round the margin of the lateral rounded flap. The inner surface and membrane behind is clothed with abundant, minute, sharp, hair-like skin-points, their apices directed backwards, *i. e.* away from the margin.

The jaws are of rather square outline, about 0.35 mm., with three large rounded teeth, three or four minute internal and six nearly as small external to them. All these teeth have finely crenated margins. On the external margin is a short but rather sharp tooth. The maxilla has a general resemblance to a larval leg. The first joint narrow externally, broader internally, with one long and one short bristle. Basal to this first joint is a plate with two or three hairs. The second joint is broad externally, narrowing (at least its chitinous covering) to a point internally, with a long bristle here. Beside the terminal joint is a rounded chitinous boss carrying three strong bristles and two small mammillæ, each with a terminal mammillula. The third joint is a little smaller than, of much the same shape and proportions as, the second antennal joint. It carries, again, a fourth joint (but no hairs), of about half its own length, and this has at end several mammillæ, one at least with a mammillula. The visible portion of the labium is triangular (nearly equilateral), with sides 0.2 mm. long; two-thirds of this (in length) seems to be in one piece. The apical third is formed of two side and one central piece. Each side-piece has a palp, the first joint about 0.05 mm. long and a quarter of this width; at end of this there is a long (0.02) conical sharp-ended piece, apparently jointed

centrally. The middle portion is a spinneret with broad base, the details of structure not easy to see. There are on the head a number of bristles, seventeen or eighteen on each side, and eight or so on the clypeus, besides a number of transparent points that might be called lenticles; all these have their definite positions impossible to describe even with unlimited prolixity. The osmateria are well-developed, two eversible processes apparently usually directed forwards, about 0.6 mm. long (possibly more if fully stretched).

The arrangement of the great prominences armed with hairs will be best appreciated by the aid of Mr. Tonge's excellent stereoscopic portrait of the larva. These prominences are a very large pair on the prothorax, which appear to represent the pre-spiracular group of tubercles, but may belong to the prothoracic plate, the spiracles being behind them and the prothoracic plate between. They have about fourteen hairs radiating in all directions on the rounded summit, and eight or ten smaller on the somewhat narrower neck. The hairs are about 0.35 mm. long, broad at the base, and tapering in a regular conical manner to the fairly sharp tip; they are quite smooth and have a slight curvature; some of those on posterior segments are a good deal curved. The prothoracic plate carries smaller hairs; on each side is a hair, rather behind the middle and near the dorsal line, another further out near the anterior margin, and a group of three behind and a little further out than this. At the lower front margin of the great column is a boss with five or six hairs. This may be the prespiracular group; if so, the large wart belongs to the prothoracic plate. The specimens are not very mature, and an appearance of the plate being continuous with the chitinous base of the wart is noticed, but may be deceptive.

On the second thoracic is a single hair on each side of the middle line, then a large wart, pillar, or horn of brown chitin carrying seven hairs, followed by another almost identical with six hairs; then a small wart with two hairs, and a separate hair just behind it; then two more slender hairs close together, those apparently so often present just above the legs. On metathorax the dorsal hair is larger than on second thoracic, the first chitinous wart is very large with nine hairs, the next rather smaller with eight, then a low wart with four hairs, and then two at base of legs. The legs carry a number of small hairs on their bases, and several on each joint. The claw is sharply bent, and has a very sharp point.

On the first abdominal segment the dorsal hair (i. ?) is still single, but the base is prolonged into a conical stem, from the end of which the hair arises. Then follows a large globular wart on a narrower neck, with nine or ten hairs, then a single hair (iii.) above spiracle. On a subspiracular flange two hairs (iv. and v.), the anterior the lower; on a lower flange four fine

hairs; a little group of three below this, and one ventral hair (VIII. ?); the hairs below are all much smaller and finer than those on the bosses. On the second abdominal i. is a small sessile hair, ii. a low wart with five or six hairs (of which two or three are large but less than those on the great warts), iii. single, iv. and v. as on first abdominal; but in place of the little group of three hairs vii. and the ventral hair is an oval area, with about a dozen fine hairs, and looking as regards size and position much like a proleg. Third, fourth, fifth, and sixth abdominal are much the same; the hairs of wart ii., however, rather smaller and finer, and prolegs in place of the ventral patch. On seventh wart ii. is a little larger; on eighth it is larger (though less than the large ones in four), and carries six rather long curved hairs, iii. iv. and v. single hairs; i. is present on ninth abdominal, but ii. is again a very high large wart, with some fourteen hairs; on tenth are again two warts, lower and with shorter hairs to the number of about a dozen on each; they are two warts, not merely a terminal fringe. There is a group of five hairs further out on tenth (or on ninth ?); there are also five or six hairs near eighth spiracle, but their homology not easy to determine. The prolegs are very large, nearly 0.2 mm. across, on short thick pedicels, the outer front of which is armed with about twenty-five short thick hairs, with one on inner posterior margin. The crochets are arranged in an oval, the long axis of which is directed outwards and backwards. The oval is, however, broken at each end, so that there is an inner posterior set of hooks of about twenty-four in number, and an outer anterior numbering about nineteen or twenty; the inner are the larger as well as the more numerous. Each set dwindles in size of hooks at each end; when collapsed the two sides meet along the axis of the oval. The claspers are in one row of fifty to sixty hooks, forming about three-fourths of a complete circle or ellipse. The spiracles are small brown circles, with lines radiating to the centre; the prothoracic one is slightly oval; longest axis about 0.04 mm.

The general surface has an extremely fine dotted texture.

DESCRIPTIONS OF PLATES III.-V.

PLATE III.—A stereoscopic picture of the newly-hatched larva, $\times 12\frac{1}{2}$. Photo by A. E. Tonge, F.E.S.

PLATE IV.—Egg-shells of *P. homerus*, $\times 10$. Photo by A. E. Tonge.

PLATE V. — Micropyle of the egg of *P. homerus*, $\times 250$. Photo by F. N. Clark.

The eggs are only empty shells, and with holes in them made by the larvæ; one or two are, however, but little deformed. The upper one is placed on its side to show the flattening of the lower surface. The stereoscopic pictures may be readily examined by means of any of the stereoscopes that are open below, of which there are several forms to be had very cheaply.

LIFE-HISTORY OF *HESPERIA PANISCUS*, F., =
PALÆMON, PALLAS; Staud. Cat.

By W. A. ROLLASON.

IN preparation for a new and completely illustrated work on the larvæ and pupæ of the British Macro-lepidoptera the following life-history has been prepared, and as but few entomologists have had the opportunity of rearing the species and at the same time drawing and describing both larva and pupa, I have thought that it would interest many students in the science to read the descriptions I have been enabled to draw up. Through the kindness of fellow-workers opportunity has since been afforded me of comparing the previously written and excellent descriptions of Messrs. Buckler, Hellins, and Frohawk, and I find my description of the larva in various stages is of much fuller detail in nearly all respects, and especially in that of the larva after hybernation. Again, also with the pupa I have a much more detailed description of its form and colour, notably in the transitional stages of colour from day to day for four or five days before emergence of imago, and which latter process, including dehiscence, I had the gratification of witnessing and describing in detail. The following is my complete record:—On June 15th, 1906, my esteemed and valued correspondent, the Rev. Gilbert H. Raynor, sent me ova from a wild Wansford female. The ovum is shining, pearly, and of a warm whitish-grey colour, inclining in some instances to bluish or yellowish. They were laid singly on fine grass stems. These hatched on June 21st, 1906, the young larvæ emerging by eating away the crown. They were white, with dull surface, and having a very large perfectly black shining head, the anterior margin of dorsal plate on second segment being also shining black. The young larvæ were supplied with tender leaves of *Brachypodium sylvaticum*, and kept indoors for four days, after which they were sleeved out in my garden on a growing plant of same. At this early stage they commenced to spin edges of leaves together. Until August 13th they were not disturbed, when on opening the sleeve I found five larvæ about five-eighths of an inch long, and they, having eaten nearly all the leaves of the food-plant, were walking about the muslin sleeve. They rest in tubular retreats formed by spinning together, though not closely, the edges of the leaves for about an inch. Their method of feeding is to practically remain in their retreat, eating away the leaf above and below to a very thin strip, and only so far as they can reach. When eaten below, this naturally causes the retreat to fall and hang. When food is again required the larva timidly leaves the retreat and hastens to make a similar one on another leaf; feeding again as before described. The larvæ were

now of a greyish-blue-green ground-colour, some being yellowish-green; pale brownish heads, reticulated with very dark brown on top, and appearing roughened; ocelli black, as also posterior edges of cheeks; a dark spot on top of second segment, and a dark dot immediately above spiracle on this segment. These dark markings appear to have taken the place of the shining black plate on anterior margin of second segment which were on the larvæ when they emerged from the egg. There is also a dark brown longitudinal blotch on top of anal flap. A dark medio-dorsal greenish stripe is continuous throughout to blotch on anal flap, and this stripe is edged on either side with lighter. There is a conspicuous sub-dorsal pale whitish-green band, edged above and below with dark green; spiracles roundish and of a pale rust-colour; legs brownish and semi-transparent; claspers and ventral area of uniform ground-colour. Larvæ cylindrical, with a little taper to both extremities, *and the second segment is remarkably small*; head oval and full; segmental divisions clearly defined; larva bears numerous minute hairs generally distributed. Immediately above spiracles is a band of darker green than ground; anal flap rather pointed and rounded; claspers fairly large; legs moderate size. When out of retreat and disturbed larvæ fall to the ground and curl into a ring, sometimes remaining a considerable time in this position without any movement. Having been transferred to a freshly potted food-plant, they were not disturbed again until September 7th, when the sleeve was again opened, and the larvæ being found to be full-fed, a careful drawing was made. They were about one inch long and in many ways quite different to the stage last described, the most notable being the absence of the brown head with its darker markings, and the absence of any dark on the anal flap or anterior margin of second segment. Head oval and full; general form cylindrical, with taper to both extremities; *second segment remarkably small*; segmental divisions clearly defined; spiracles roundish; legs and claspers rather small; anal flap pointed and rounded, and a little concave on dorsal area; segments three and four are transversely wrinkled, and segments five to eleven are each transversely wrinkled in *five* rings, the anterior being much the widest, the second smaller, and the last three smaller and of uniform width; segment twelve is transversely wrinkled in *four* rings. Markings: Surface dull and of a uniform greyish-blue-green ground-colour, sometimes the tinge inclining to yellowish-green. They have a somewhat velvety-looking appearance, probably due to being clothed with very short and minute hair. Head pale brownish or pinkish-green with black ocelli, and a thin dark line down centre; clypeus of ground-colour; labrum and mandibles pale brownish or pinkish, the mandibles being dark brown at centre. There is a pulsating medio-dorsal stripe of darker green than

ground, and this is edged on either side with a paler line than ground. A conspicuous sub-dorsal stripe of pale greenish-white, sometimes appearing yellowish, is continuous throughout, and terminates on anal flap. This stripe is edged above and below with a band of darker green than ground, and this darker green is again edged with lighter than ground. The spiracular line is light yellowish-green, but not conspicuous. On it are situated the spiracles, which are of a rusty tinge edged with lighter. The spiracular line is edged above with a green band of darker colour than ground. There is a subspiracular skinfold, and this with ventral area is of uniform ground-colour; legs and claspers of uniform ground-colour. There are a few very inconspicuous greyish-brown dots in region of spiracles, and very fine short hairs generally distributed over larva. When walking, larva has that trembling movement of anterior segments so characteristic of geometer larvæ, and is very lethargic in its movements. Larvæ were fed up throughout *outdoors* on a growing plant of *Brachypodium sylvaticum*. They were brought indoors early in November, when five larvæ had formed hybernacula, about an inch long, by binding together edges of a leaf with silken threads, one having attached itself to both a leaf and the muslin. They were kept in a cold room all the winter. On Feb. 10th, 1907, they were removed, together with their hybernacula, into a smaller pot, which was covered by a glass cylinder with muslin across top. This disturbance caused one larva to come out of its hybernaculum; this was the one attached to the muslin—it wandered about in a lethargic manner and finally rested on the muslin covering top of cylinder, where it remained three or four days, and afterwards was found on the surface of the earth in a very comatose condition. At this period the larva was a little reduced in length from the time when drawn, namely, September 7th, 1906. The ground-colour was pale creamy-white; medio-dorsal stripe rather pale chestnut-brown, but darker than ground-colour; the subdorsal stripe paler than ground-colour, inclining to a yellowish tinge, and edged on either side with pale chestnut-brown; the spiracular band is of similar colour, but only a very little darker than ground, the spiracles showing dark against it. There is a row of dots above spiracles, in size and colour resembling them, and two similar longitudinal rows on dorsal area. Head dull ochreous-grey, inclining to a greenish tinge as compared with body, with a dark brown line across top; ocelli black; mandibles dark brown. Surface dull throughout, including head, and densely clothed with very short hairs. This larva, after wandering about restlessly for several days, finally fixed itself to muslin covering top of cylinder on March 10th, 1907. It changed to a pupa on March 20th, attached at anal end to a silken pad, and with a silken thread around waist. Two more larvæ emerged from their hybernacula

on March 13th. Their hybernacula were pinned to bits of muslin attached to a stick in the centre of a flower-pot. To these bits of muslin they attached themselves the same day, near by their hybernacula, and both changed to a pupa, head upwards, on March 23rd. Another larva emerged from hybernaculum on March 18th, attached itself the same day in the manner before-mentioned, head upwards, and changed to a pupa on March 24th.

Although these larvæ were in a flower-pot with a growing plant of *Brachypodium sylvaticum*, they never attempted to eat the leaves, neither did they crawl over them, always crawling on the dead leaves which formed their hybernacula, or up the dead stick in the centre of flower-pot, thus proving that they *do not eat* on emergence from their winter sleep, but proceed almost at once to prepare for changing to pupa.

I made three careful drawings of the pupa on March 24th, 1907, together with the following description:—

Pupa. Form cylindrical, slender, both dorsally and ventrally curved, with a little taper to both extremities. Head rather blunt, but with a fairly long spike-like projection directed forward and upward; eyes large and prominent. Pupa widest across base of wing cases, the latter being fairly ample; segmental divisions very clearly defined; spiracles oval; wing cases extend to anterior margin of segment five; maxillæ uncovered and extending rather more than five-sixths length of wing cases; first legs about half-length of maxillæ; second legs about three-quarters length of maxillæ; antennæ scarcely as long as second legs; wing cases rather ridged at sides; labial palpi showing; labrum very prominent; mandibles showing; both dorsal head-piece and prothoracic segment very distinct; abdominal segments have a few slight depressions.

Anal appendages. A flattened projection, dorsally curved, with about a couple of dozen curved spines, hooked at tips, at end, on under side.

Markings. Surface dull, excepting eyes which are a little glazed. Head, wing cases, cases of antennæ, legs, &c., dull yellowish-grey inclining to ochreous-green, with edges of wing cases and antennæ edged with dark brown, whilst the maxillæ are very conspicuous by being dark purplish-grey brown. Abdominal segments and also first, second, and third thoracic segments are of a pale creamy ground-colour. Commencing on dorsal headpiece and terminating on anal appendage is an irregular dark brown band, becoming pinkish towards anal end. On either side of this are two irregular bands, darker than ground-colour and of a pale crimson hue, becoming paler and thinner on second thoracic segment where they commence, as also on ninth segment where they terminate. The area between these two stripes is rather more creamy than general ground-colour. On either side of spiracles is an irregular band of similar hue, but

much paler; ventral area dull greyish-yellow with some pale greyish blotches on segments five to seven; spiracles dullish-yellow; hooks of anal appendage reddish-brown. On two of the four pupæ I had the mandibles were conspicuously black and shining.

On April 16th, 1907, the eyes turned pink and wing cases darkened a little. On April 17th, eyes became dark purplish-grey, and wing cases darker and of a brownish hue. On April 18th, the bodies went dark, and the whole pupa became dusky purplish-grey. On April 21st, three imagines emerged between 12.30 and 1.15 p.m. I first noticed one male fully emerged and drying his wings, which were not quite fully developed. About fifteen minutes later I saw another partly emerged and watched its completion; this proved to be a male also. At 1.15 p.m. my last pupa, which I had been constantly watching with a powerful lens for about half-an-hour, I saw burst first the dorsal line down second thoracic plate; then transversely the division between first and second thoracic plates, and finally the complete emergence. This proved to be a female. One pupa died, the first I had obtained on March 20th. It will therefore be seen that the dates of pupation of the three others were March 23rd (two) and March 24th (one), but they all emerged on the same date, namely, April 21st, 1907, between 12.30 and 1.15 p.m. I therefore have had the gratification of rearing, and recording the complete metamorphosis of, this very local insect.

Lamorna, Truro, Cornwall: March, 1908.

NOTES ON SOME TRANSVAAL MOSQUITOES, INCLUDING TWO NEW SPECIES AND A NEW VARIETY.

By FRED. V. THEOBALD, M.A.

A LARGE consignment of mosquitoes from the Transvaal, collected by the late Government entomologist, Mr. Simpson, whose untimely death has been so felt and regretted by all in South Africa, has been recently examined, and has proved of considerable interest. Firstly, because two new species were found in it which are described here; secondly, because the rare *Etiorleptomyia mediolineata*, Theob., described from a single specimen from the Sudan, occurs in it; and, thirdly, the enormous variation in size shown in some of the common Vaal species. Three particularly need notice in connection with the latter, namely, *Culex tigripes*, Grandpré, *C. simpsoni*, Theob., and *C. dissimilis*, Theob. The first vary in size from 6.8 to 5 mm., the second from 8 to 4 mm., the latter from 5.5 to 4 mm. The last-named insect is of particular interest, for, as far as I can see

after examining the numerous specimens, the smallest and the narrow pale-banded proboscis forms are my *C. dissimilis*; the large, broad, pale-banded proboscis forms are my *C. hirsutipalpis*. I cannot detect any differences except in size and general appearance, but in the large Transvaal series every gradation from one to the other could be found. I therefore propose to sink *C. hirsutipalpis* as a large variety of *C. dissimilis*. The same is seen in the *Pyretophorus costalis*; some specimens measure 5 mm., one only 3.4 mm., and in the smaller forms the leg markings are less conspicuous.

This collection of some hundreds of specimens is poor in Anophelines, which seem to be only abundant in certain areas of the Transvaal and not uniformly spread over it as in some warm countries.

Besides *P. costalis* the following also occur:—*Cellia squamosa*, Theob., *Pyretophorus cinereus*, Theob., *Myzorhynchus mauritanus*, Grandpré, and *Myzomyia funesta*, Giles.

The large *Theobaldia spathipalpis* of Rondani also occurs in the collection, so we now have it known in Africa at the Cape, Transvaal, Sudan, Egypt, and Algeria, as well as in Southern Europe, the Mediterranean Islands, Canaries, and the Azores.

Banksiella luteolateralis, Theobald, var. *circumluteola*, nov. var.

Head like the type, also proboscis and antennæ; palpi of female all black. Thorax with creamy lateral areas, which unite in front, forming a continuous mass behind the head, the dark median area having only bronzy-brown scales, and being narrowed in front.

The wings have more brown-scaled areas than the type, the only creamy-scaled veins being the basal half of the first long vein and the fifth, except its upper branch; there are also pale lateral scales on the apical half of the subcostal, and a few indistinct ones on the basal part of the second and fourth veins. The stem of the first fork-cell is half the length of the cell, and that of the second about two-thirds the length of the cell. Abdomen as in type, also legs. Length 5 mm.

Habitat. Transvaal (Mr. Simpson).

Observations.—Differs from the type and other varieties in the pale lateral thoracic area extending around the front of the thorax, and by the less pale scaled areas on the wings.

Etiorleptomyia mediolineata, Theob.

(1st Rept. Wellcome Res. Labs. p. 71) (1904).

The single specimen (a female) in the collection shows some slight variations from the type.

The palpi are white-tipped instead of being all black. The thorax is more ornate, having an area of bronzy scales on each side in front and behind, and a small area on each side between them, these areas separated by the golden scales. The scutellum has some

creamy flat scales with the black ones, which latter only occurred in the type.

The pleuræ have some flat white scales which could not be seen in the type, owing to its being somewhat damaged.

All other characters agree with the specimen from the Pibor.

Ficalbia inornata, nov. sp.

Thorax and abdomen uniform deep brown; proboscis moderately long, deep brown; pleuræ pale brown. Legs uniform brown. The whole insect with bronzy reflections in bright light.

♀. Head brown, with dull flat scales and paler upright forked scales; clypeus pale; proboscis uniform in colour, brown in some lights, violet in others, swollen apically where it is testaceous; antennæ brown; basal segment pale.

Thorax deep brown, with traces of a paler line in the middle and in front at the edges, clothed with scanty narrow-curved bronzy scales and long black backwardly-projecting chætæ, especially posteriorly and over the roots of the wings; pleuræ pale brown with some grey reflections; scutellum with small flat brown scales showing violet reflections, forming a large mass on the mid lobe, small areas on the lateral lobes, mid lobe with two long median border-bristles, then two shorter ones and a few still smaller; metanotum nude, deep brown. Abdomen brown, unbanded, with metallic violet and traces of green reflections; pale ventrally.

Legs uniform brown, with bronzy and violet metallic reflections, paler basally; unguis small, equal and simple; wings with typical brown Ficalbian scales, a somewhat dense patch of them above the cross-veins; outer costal border spinose and dark; subcostal vein-scales dark, also the single-rowed median vein-scales, lateral ones pale; fork-cells of nearly equal length, the first submarginal slightly the narrower, its base slightly nearer the apex of the wing, its stem not quite twice the length of the cell; stem of the second posterior cell about one and a third the length of the cell; posterior cross-vein wider than the mid, a little more than its own length distant from it; halteres with pale stem and fuscous knob. Length 3 mm.

♂. Head with flat, rather loose violet-brown scales, some showing an ochreous tinge; upright forked-scales dark, showing ochreous reflections in some lights, especially behind; apparently a single large curved median black chæta projecting forwards between the eyes; antennæ plumose, dark brown, basal segment pale; palpi very short; proboscis dark.

Thorax as in female, but two median bare lines, very distinct. Abdomen as in female, but with traces of indistinct pale basal lateral spots on the three more basal segments. Fore and mid unguis unequal and simple; hind equal and simple.

Wings very similar to the female, but the fork-cells relatively shorter. Length 3 mm.

Habitat. Transvaal (Mr. Simpson).

Observations.—Described from a perfect female and two males.

This is the first female recorded, the three previously known

species all being founded on males. The only other African member of this genus known is *F. nigripes*, Theobald, from Sierra Leone (Mono. Culicid. vol. iv. p. 578, 1906), which differs from the Transvaal species in having a banded abdomen, the basal white bands being very prominent in the Sierra Leone insect. The female wing-scales agree with those of the male in this genus, and the discovery of the female does not necessitate adding anything to the definition of the genus.

Ædes inconspicuus, nov. sp.

Head dull ochreous-brown, paler than the brown thorax; abdomen, legs, and proboscis, all dark brown.

♀. Head deep brown, with small, rather loose, flat scales over most of the area, some dull ochreous, others brown, and others with a dull violet tinge, the ochreous hue prevailing, behind a large patch of narrow-curved ochreous scales, thin ochreous upright forked-scales behind, brown in front; chætæ long, deep brown; palpi rather small, proboscis and clypeus deep brown; antennæ deep brown. Thorax deep brown, with narrow-curved pale brown scales, showing some ochreous reflections; chætæ deep brown; scutellum pale brown, with narrow-curved pale scales and five deep brown border-bristles; metanotum deep shining brown; pleuræ grey.

Abdomen deep brown, with dull violet reflections; on the venter the segments are pale at their bases; border-bristles pale brown.

Legs deep brown, unbanded; the tarsi showing dull ochreous hues; unguis small, equal, much curved and simple.

Wings with long thin brown lateral vein-scales; fork-cells long, the first submarginal cell much longer but only slightly narrower than the second posterior cell, its base considerably nearer the base of the wing than that of the latter, its stem about one-fourth the length of the cell; stem of the second posterior nearly as long as the cell; posterior cross-vein nearly three times its own length distant from the mid. Length 3 mm.

♂. Antennæ plumose, plumè-hairs brown, internodes grey; palpi very small, brown. Head, thorax, and abdomen as in the female, but the abdominal segments are deeply constricted at the base and the scales at the apical edges show dull ochreous reflections (not banding). Wings much as in the female, but the stem of the first submarginal cell only one-third the length of the cell, and the posterior cross-vein only about one and a-half times its own length distant from the mid. Ungues of fore and mid legs unequal, uniserrate; hind small, equal, and simple. Length 3 mm.

Habitat. Transvaal (Mr. Simpson).

Observations.—Described from a single female and male. A small, brown, inconspicuous mosquito, the only species of this genus as yet recorded from Africa.

ON MOUNTING COLEOPTERA.

BY H. F. FRYER, F.E.S.

;(Concluded from p. 88.)

Mountant.—Gum tragacanth dissolved in water to the consistency of a thin jelly, with the addition of a little carbolic acid, is generally recommended, and is perhaps the best mountant for beginners, as it is easy to work with and easily made. For larger species I use a formula containing gum Arabic, sugar water, and alcohol; but with small species, unless very skilfully manipulated, it tends to gum up the antennæ and tarsi, rendering species which depend on these characters very difficult to determine; moreover, the finished effect is “shiny,” and not “dead” as with tragacanth.

Instruments.—Two moderately soft hog’s-hair brushes, for brushing out the legs of refractory species.

Two camel’s-hair, or preferably soft sable, for use with more fragile species.

A very finely-pointed sable for setting.

Two of the finest needles procurable. These should be run into cylindrical corks for holders. I find the cork bored from any ordinary cork of good quality with a large-sized cork-borer will do. The needle is run for about one-third of its length, and the cork handle then filed down to a fusiform shape.

A finely-pointed pair of tweezers is almost a necessity for picking up small species and placing them correctly on the card. I am assuming, of course, the possession of the ordinary entomological “nippers,” and that nothing—either beetle, card, or pin—is ever touched with the fingers.

A piece of the entomological peat about three inches by eight glued to a piece of soft deal three-fourths of an inch thick for holding the specimens as they are set, and for regulating the height of the card on the point.

A turntable, although not absolutely necessary, is an immense convenience, as a touch of the finger brings the insect to be mounted into any desired position. I use one of those with which microscopists make their cells, and on the brass stage are glued two thicknesses of cabinet cork; at the other end of the wooden support is fixed the handle of a carpenter’s gouge, and on this is slipped, at the proper focus, a lens of about two inches diameter and four inches focus. It is a “home-made” arrangement, but with it there is no difficulty in setting up the smallest species.

Method.—I must presume the specimens are in the right state of relaxation; many are perfectly impossible to set unless this is so. Now, taking as an example a very easy species, *Demetrias atricapillus*, the beetle is lifted by a leg with the fine

tweezers, placed on white blotting-paper, and its legs, antennæ, and palpi brushed out with the soft camel's-hair or sable brushes, using one in each hand. I must here insist on the advisability of cultivating the use of both hands in nearly every operation in setting. The proper sized card is then selected, and the locality and date having been written underneath with an etching pen and Indian ink, it is pinned in the centre of the stage of the turntable, and the gum spread evenly over it with a small brush kept solely for this purpose. The beetle is lifted as before, and placed as nearly as possible in its correct position on the card, then with a needle in the left hand to steady it, if need be, its legs, antennæ, and palpi are brushed into position with the finely-pointed sable, which should always be used when possible in preference to a needle. It is well to have a little water at hand in which to dip brushes and needles when they become gummy; the porcelain crucible before mentioned, used for killing, will answer this purpose as well. The legs and antennæ should be symmetrically arranged, the latter pointing towards the corners of the card; after this is done the specimen is placed on the peat-covered board, and the pin pushed down as far as it will go, and when dry the beetle is ready for the cabinet.

The *Rhynchophora* are not quite so easy, and care must be taken to brush out the rostrum and antennæ before placing the beetle on the card. With this section it is generally necessary to work at first with two needles, drawing out a leg on each side at the same time, and avoiding all jerky and ill-regulated movements.

In the more difficult genera still, *Onthophagus*, *Hister*, *Byrrhus*, &c., it is sometimes necessary to hold the insect firmly in position while the legs are drawn out with the fine tweezers. This I do with a bristle similar to that used by lepidopterists. A hole is made with a pin in a small piece of cork the size of a barley corn, a stiff bristle is then inserted, and the pin stuck through at right angles to it. One of these on either side will hold a beetle securely in position while the various manipulations are going on.

I have said nothing as to the advisability of mounting one of a series to show the under side, as it is not every one who recognizes a species at sight, and it is quite possible, where the species are near together, to get the under side of one species mixed up in the series of another. Should, however, it be necessary to mount a specimen in any but the usual way, it should be mounted on its side, as then the characters of both upper and under side can be more or less seen; but I prefer, when one wants to examine the under side, to float off the insect with hot water.

In conclusion, it is as easy, with a little care and patience, to make a perfect specimen as a badly set one, and when a

series is placed in the cabinet, the effect is worth the slight extra trouble.

With regard to recording one's captures I have a Beare & Donisthorpe's 'Catalogue,' interleaved, in which every species taken is set down, with locality and any other note of interest. After a few years a record of this kind becomes very valuable when studying the geographical distribution of species; and though, of course, a collector will conscientiously label each insect he sets, a well written-up catalogue is very convenient for reference.

The Priory, Chatteris: February, 1908.

A NEW VARIETY OF *AMPHIDASYS BETULARIA*.

By WM. MANSBRIDGE, F.E.S.

At a recent meeting of the Lancashire and Cheshire Entomological Society Mr. T. Baxter, of St. Anne's-on-Sea, sent for exhibition, among other things, a female specimen of a buff form of *A. betularia* captured by himself at St. Anne's in June, 1891. The specimen was kept for five days, but unfortunately no ova were obtained.

A description of Mr. Baxter's insect is as follows:—

Antennæ pale ochreous, banded with black; thorax and abdomen pale ochreous mixed with black; fore wings with costa brownish ochreous, the remainder of the wings ochreous with typical black markings; hind wings with ground-colour somewhat paler ochreous, especially on the costa; black markings typical. The black is somewhat dull, doubtless owing to the presence of a few reddish brown scales, which can be seen in a good light with the help of a strong lens. Expanse 60 mm. (= 2½ in.)

From the above it will be seen that this moth is typical as to the black markings, but that the white ground-colour is replaced by ochreous; and that the normal ochreous suffusion on the costa of the fore wings of the typical female is brownish ochreous.

I have had an opportunity of comparing this specimen with an example of the so-called buff form obtained by the Middleton collectors about 1875 (Entom. xxii. 113, 162; xxxiv. 180, 203, 228, 252, 324), in which the ground-colour is pure white, and the black markings totally pale reddish brown, so that Mr. Baxter's insect is quite distinct from the Middleton varieties.

As this is a natural variation being due to an extension of colour normally present, and likely at any time to recur, I propose the varietal name *ochrearia* to distinguish it.

OBSERVATIONS ON THE LIFE-HISTORIES AND
BIONOMICS OF SOME TACHINIDÆ.

BY H. S. LEIGH.

DIPTERA—although not generally a favourite group with entomologists—forms one of the largest and most important orders of insects. Their economic significance is very great, some of them being capable of conveying the most serious diseases, whilst others act as scavengers by devouring all kinds of waste products.

Many species live parasitically on various lepidopterous larvæ, and thus, together with the ichneumons, help to keep the numbers of certain Lepidoptera within bounds. This is of great importance to man, for some species of caterpillars are very troublesome pests, and at times occur in such countless numbers on cultivated plants as to strip them of all foliage.

In several districts around Manchester the larvæ of *Abraxa grossulariata*, Linn., have been very common during the last few years; I have on one occasion collected 1500 from one garden, and taken about 3000 altogether during 1906 and 1907. This shows how very prevalent the species frequently becomes in some localities, and anything that can help to lessen its numbers will be extremely beneficial.

The Tachinidæ, one of the families comprising the Muscidæ Calyptrata, contains very many species of flies which are parasitic on Lepidoptera and Hymenoptera. These flies look—at first sight—so like the ordinary house fly, *Musca domestica*, Linn., that they are no doubt often mistaken for such.

One species of Tachinid, *Blepharidea vulgaris*, Flin, which attacks the larvæ of *A. grossulariata*, is often very abundant during the latter part of June and beginning of July. I have bred many of these flies from caterpillars collected in May, and Mr. Wainwright says it is "one of our commonest species, with many known hosts." The proportion of parasites to hosts was about eighty-five of the former to one thousand of the latter, so that rather more than eight per cent. of the caterpillars were parasitised.

Mr. Hewitt* has found that the infected *A. grossulariata* larvæ contain newly-hatched Tachinid larvæ during early May, when the former are about half-grown. About the middle of June both are matured, and the parasite breaks through the body-wall of the host just prior to pupation. The Tachinid larva pupates a few hours after leaving the body of the host, and under natural conditions the pupæ are probably formed on or just below the surface of the soil.

* "Bionomics of certain Calyptrata Muscidæ and their Economic Significance," Journ. Econ. Biol., vol. 2, No. 3.

It appears that not more than one Tachinid larva is ever present in one caterpillar of *A. grossulariata*, although I have found two or three individuals of another species of Tachinid parasitic on one larva of *Saturnia carpini*, W. V., *Endromis versicolor*, &c.

The pupal stage lasts approximately a fortnight, the flies beginning to emerge about the end of June, and continuing for a week or more. The flies differ greatly in size, some being half as large again as others; a fact which is no doubt accounted for by the quantity of nourishment acquired during the larval period. The flies live for about a week or ten days in confinement, but seem to take no heed of any lepidopterous larvæ when placed in a cage with them. How these flies exist between this date, June, to the beginning of May in the following year is not definitely known, but Mr. Hewitt suggests that the Tachinid has another brood, and that this brood lives in another species of lepidopterous larva. This view is strengthened by the fact that many records exist of one species of Tachinid infecting different species of lepidopterous larvæ, and it is even suggested that one species of Tachinid might parasitise not only insects belonging to a different species or genus, but of a different order.

A. grossulariata has only one brood* in the year, and if *Blepharidea vulgaris* is confined to it, the flies must survive much longer in the perfect state than they do in confinement.

The young larvæ of *A. grossulariata* do not appear until about the first or second week in August, which would mean the flies living for six weeks at least before being able to deposit any ova. Even then the *A. grossulariata* larvæ are extremely small, and I think it very improbable these Tachinids would infect them. I think that *B. vulgaris* selects a species of lepidopterous larva which is about half grown in early July on which to deposit its eggs. In this case the resulting larvæ would probably be full-grown about the same time as the host, and pupation take place some time in August. These pupæ would then remain unhatched until the following April, when there would be *A. grossulariata* larvæ available for infection.

During September, 1907, I collected about one hundred larvæ of *Spilosoma lubricipeda*, Linn., from which I bred twelve Tachinid larvæ. These appear, from the pupæ, to be a much larger species than *Blepharidea vulgaris*. About the second week in September the Tachinids pupated, and this agreed exactly with the time of pupation of *S. lubricipeda*. I attempted to force these pupæ by placing them on October 18th in a stove, the temperature of which varied from 70° to 85° F. The result was that they absolutely refused to be influenced by the abnormal heat, which was allowed to act for six weeks. Afterwards they

* A partial second generation occasionally arises.

were taken out of the stove and kept under normal conditions, and none have shown any signs of emergence up to the present date (April 6th). This persistence to remain over a lengthened period in the pupal stage—in spite of such great heat—seems rather curious, particularly as the Tachinidæ belong to a group of insects whose development is often completed in a few weeks, and frequently much influenced by temperature.

The Tachinidæ have, I think, a certain number (perhaps two, three, or four) of broods* in the year, and cannot be induced to give rise to an additional one by artificial means. This at any rate appears to be the case in the autumn, but if extra heat be applied throughout the summer months some effect would probably be witnessed. No doubt the Tachinids obtained from the *S. lubricipeda* larvæ had lived during the earlier part of the season in another species of lepidopterous larva, and those individuals bred in September represented the second or third brood.

I have also obtained several species of Tachinidæ from *En-dromis versicolor*, Linn., *Saturnia carpini*, W. V., and *S. pyri*, W. V.†; in these instances one caterpillar supported three or four parasites instead of one only, as in *A. grossulariata* and *S. lubricipeda*. The winter was passed in the pupal stage, and my observations contribute to the belief that most, if not all, of the Tachinidæ probably remain in this state throughout the winter.

In most cases the emergence of the Tachinids from winter pupæ takes place about the same time as the emergence of the hosts, *i. e.* those obtained from *E. versicolor* emerged in April; the species parasitic on *S. carpini* in late May and June; those from *S. pyri* in July; and I expect the pupæ bred from *S. lubricipeda* will produce the flies in June. It seems impossible, therefore, that one species of Tachinid can ever be confined to one host or even to hosts belonging to one genus.

About the beginning of June, 1907, I received a few specimens of a Tachinid from Mr. L. W. Newman which had been obtained from the larvæ of *Sesia tipuliformis*, Linn. This species, *Pelatachina tibialis*, Fln., is of economic importance, the "currant clearwing," which it parasitises, being one of the commonest of the Sesiidæ, and often very destructive to our currant-bushes. How the *S. tipuliformis* larva becomes parasitised I do not know, as it lives in the pith of the stems of currant-bushes, and it is difficult to conceive how the fly is able to deposit its ova in a suitable position for the resulting larvæ to infect their host. Mr. Wainwright informs me that *Pelatachina tibialis*, Fln., has

* This number of broods will vary according to the species, but most probably two or three will be the usual number.

† *Masicera silvatica*, Fln., a species which is parasitic on *S. pyri*, and other hosts; it is a Continental species, and very little known as British.

been bred from other hosts, but that its occurrence as a parasite of one of the Sesiidæ is new. This Tachinid probably attacks another species of lepidopterous larva in June or July, the resulting brood reaching the pupal stage in the autumn, and remaining as pupæ until the following spring. The life-histories of the Tachinidæ are, however, scarcely known; the number of broods in a season, the various hosts infected by a particular species, and the proportion of caterpillars they destroy is still a very uncertain question. The fact of many Tachinidæ being parasitic on certain Lepidoptera, and thus helping to keep some of the ravages of the latter under control, compensates in a great measure for the pernicious habits of other members of the Muscidæ; so that really some of the creatures many persons often condemn as an unmitigated nuisance are, in various ways, of the greatest service to man, and their bionomics of great economic importance.

I wish to express my thanks to Mr. C. J. Wainwright for help received in connection with one or two of the species mentioned

ODONATA IN GERMANY.—I.

By E. R. SPEYER, F.E.S.

LAST year (1907) I had the opportunity of making some observations on Odonata in Germany. I spent the summer from April till the end of September at Marburg-on-the-Lahn, a University town lying just north of Frankfurt-on-the-Maine. In April I had found two or three stagnant ponds, which seemed suitable for Odonata collecting, and of course there was also the river Lahn.

On the outskirts of the town there is a large pond, lying parallel with the river, and separated from it by a bank only. At one end of it is a reed-bed, and all along it, on the opposite side to the river, runs a high bank covered with grass and small bushes.

At the other end of the town, near the Southern Railway Station, is another large sheet of water some distance from the river. This pond is surrounded by high and steep banks, covered with trees and bushes on one side of the water, and with high grass on the other. The water is ornamented with yellow water-lilies and high reeds, the whole forming an ideal spot for insect life.

In the immediate neighbourhood there is no other stagnant water, with the exception of two small ponds in a brickyard on the road to Giessen.

About five miles from Marburg itself towards Giessen is a marsh, which proved very productive for certain species of dragonflies not found elsewhere in the district.

Almost all the species mentioned below were identified by the help of Mr. Lucas's excellent book on 'British Dragonflies,' and Dr. Selys's 'Monographie des Libellulidées d'Europe.'

My thanks are especially due to Mr. K. J. Morton, of Edinburgh, who so kindly identified and distinguished the species of the genus *Sympetrum* for me. For the identification of *Erythromma viridulum* I am indebted to the editor of the Ent. Mo. Mag., and Mr. H. Campion supplied me with information about the Acari on the body of *Erythromma naiax*.

In this part of my paper the Anisopterid Odonata only are dealt with. The second part will treat of the Zygopterides.

The following Anisopterides were observed during the summer of 1907 at Marburg-on-the-Lahn :—

Sympetrum striolatum, Charp.—Owing to my having mistaken this species for *S. vulgatum*, I am not quite clear as to how common the former really is. At any rate, I took very few specimens, and never saw the female. Its distribution seemed also limited, for I have no specimens from the brickyard, the river, or the marsh.

The first specimen was taken on August 27th, and I have no record of it after September 9th.

S. vulgatum, Linn.—This interesting dragonfly was well distributed, but not very plentiful; in the brickyard and along the river, however, I did not observe it.

A male and female made their appearance on August 25th, and on September 23rd the species was still obtainable.

A female taken in the marsh on September 8th had the lines on the sides of the abdominal segments broadly and distinctly marked, and males observed after this date had very brown wings.

S. sanguineum, Müll.—The insect occurred in plenty from July to September in all the localities except in the brickyard. There was little variety in the size and colour of the specimens, but they were smaller than most British examples. On July 8th I took the first specimen, an immature female, and the species must last well into October.

S. flaveolum, Linn.—The marsh was the only place where I found this species. There it was very plentiful in September, and exhibited great variety in size and in the amount of saffron suffusion on the wings. The smallest specimens measured 28.5 mm. only. At first I took the latter to be hybrids of this species with either *S. scoticum* or *S. sanguineum*, especially as I had found the different species united *per. coll.* on several occasions; but Mr Morton, to whom I sent specimens, concludes that they are varieties only.

S. scoticum, Don.—Like the last species, this one was also obtained in the marsh in September, but it was less plentiful, and the female was scarce.

It was the habit of the male to hover just over the tops of the reeds, and to settle very seldom, making its capture a very difficult matter, as it was always remarkably shy.

As alluded to above, I took a male of this species united *per. coll.* with a female *S. flaveolum*, and on another occasion I captured a male *S. sanguineum* united *per. coll.* with a female *S. scoticum*.

Libellula depressa, Linn.—This insect appeared in the brick-yard only, and in June it was sometimes plentiful there. On May 23rd I took an immature female, and on July 21st a very much worn female fell to my net.

One hot day in June I saw a male and female flying on intimate terms, and in trying to catch them I knocked the female into the water. Several males immediately came and hovered over her, and I could have taken quite a number if I had wished. This would perhaps be a good method of catching males of *Anax imperator* or of any other species difficult to net.

L. quadrimaculata, Linn.—A single male of this dragonfly turned up at the pond adjoining the Lahn on July 8th. I did not observe the species again.

The specimen in question has very little saffron suffusion on the wings, and there is no brown suffusion at their extremities at all. At the nodal points the black cloud is but slightly marked. This is curious, considering that South of England specimens as a rule have more suffusion on the wings than those from the north.

Orthetrum cancellatum, Linn.—This was certainly an abundant dragonfly.

On June 10th, as I was walking along the bank of the pond adjoining the Lahn, scores of immature females flew out of the long grass when they were disturbed. But their chance of escaping with their lives was small, for they were slow of flight, and many of those which did not enter the collector's net made dainty morsels for the flocks of sparrows which apparently awaited them at the top of the bank.

When mature the habits of this dragonfly are very different. To see a mature male, fully invested with his blue colour, and flying at full speed over the surface of the water, is indeed a wonderful sight; suddenly the insect sweeps round, and the next moment is quietly resting on a piece of bare ground on the bank; here he remains with wings bent over. Now is the collector's only chance; he must approach carefully from behind, but not too slowly, or the dragonfly darts off, only to settle some distance further on, or once more to embark on its reckless flight over the water.

The habits of the female when ovipositing are also interesting. At about a yard from the bank she may be seen dipping the tip of her abdomen quickly and at random into the water, flying onwards all the while. After a time she will fly out over the water, probably followed by several males, one of which will copulate with her, and both will fly back to settle on the bank; having rested there awhile, both fly over the water, and the female breaking loose again begins ovipositing. I watched the same female do this repeatedly, and the process of oviposition seems to point to the fact that, in this dragonfly, different batches of eggs are fertilized separately. The female emerges about a week before the male. The females which I took in August perhaps had a trace of blue powder on the abdomen.

I observed the insect for the last time on August 27th. In July there were a few specimens in the brickyard, but the species was most plentiful at the pond adjoining the Lahn.

Cordulia aenea, Linn.—The first dragonfly I came across in Marburg was an immature female of this species; it was picked up in the town on May 12th and brought to me. On May 23rd it was out in some numbers along the banks of the Lahn towards Giessen, but on May 25th there were none to be seen in this locality. I next observed the species on June 9th at the pond adjoining the Lahn, and after this it was plentiful until August 3rd, after which date I did not observe it. From the brickyard and the marsh I did not record it. It was also plentiful along the banks of the Lahn in June, and at a small pond in the Marburg botanical gardens, which, by the way, are situated in the heart of the town. The habit of this species is to fly backwards and forwards along the edges of ponds, seldom settling under the banks. It is very wary and difficult to net. Once or twice I saw specimens settle in the grass; and on one occasion I found a male resting on a dead twig.

The female oviposits in the shallow water among reeds by dropping the eggs quite at random. When thus engaged the insect is by no means shy.

Somatochlora metallica, Van der L.—On August 3rd I noticed a dragonfly ovipositing in the thick reeds by the side of the pond near the Southern Railway Station. At first I thought it was *Cordulia aenea*, but when I tried to net it, it at once flew up and settled among the branches of a plum-tree close by. Thinking this very peculiar for a female *C. aenea* to do, I followed and drove the insect back to the water, where I captured it, and found it to be a fine female of *S. metallica*.

Ovipositing is much the same as that of the last species.

I did not come across the dragonfly again.

Gomphus vulgatissimus, Linn.—While boating on the river Lahn on May 15th, I found an empty nymph-case clinging to a leaf on the bank.

On May 23rd the insect was out in large numbers along the river towards Giessen; it was then immature. On May 25th I expected to find it plentiful again, but the result of a morning's search revealed a single female only, and I never saw the dragonfly again.

Evidently most of the life of this species is spent far from water, but when and where ovipositing takes place remains a mystery to me.

Landenia forcipata, Linn.—I took two males of this remarkable species; one rather immature one on June 27th on the banks of the Lahn, and another mature one on September 19th near the Southern Railway Station. In addition to these, I believe I saw another male at the pond by the Lahn on July 8th.

The habit of the male is to settle repeatedly on the bare ground. Its flight is rapid, but it is not shy, and can easily be taken in the net. The species is quite unique with regard to its anal appendages, which are turned in at right angles to each other.

Æschna cyanea, Müll.—To my surprise this species was most uncommon, but in hotter summers it is no doubt very plentiful. I took the first male on August 26th; on September 9th the males were plentiful at the pond near the Southern Railway Station. In the marsh I took two males. On September 19th the species was by no means over, and it probably lasts till the beginning of November in favourable weather.

Æ. grandis, Linn.—Undoubtedly common and well distributed in Europe, *Æ. grandis* was also extremely plentiful at Marburg. On August 3rd the first specimen (a female) turned up, and on the same date I found an empty nymph-case.

When ovipositing, it was no difficult matter to catch the female, but the male would always fly rapidly backwards and forwards in the centre of the pond, very seldom settling on the banks; and here it was impossible to net, for if the least attempt was made to approach it, it would fly off at once. While on the wing it would occasionally give a large swoop over *terra firma*, and then it was the collector's only chance.

Æ. isosceles, Müll.—I hardly expected to find this magnificent dragonfly; but one hot afternoon in June (the exact date was June 28th) I saw a fine male hovering and circling over the pond near the Southern Railway Station. With the small net I had with me, it was no easy matter to catch it, although I repeatedly got nearly within striking distance. After flying lazily over the water, the insect would settle on a reed and remain there some time. When approached from in front it was very shy, but from behind I once got within easy striking distance—but my stroke was a bungling one, and off soared the beautiful creature over the trees, leaving me with the impression that I was not going to see it again. But within five minutes it was again hovering

over exactly the same spot, and in another thirty seconds was in my possession, for this time my net struck true.

On July 21st I found a nymph-case clinging to the reeds in the same locality; and on July 16th I saw a dragonfly which appeared to be another male of this species, but I was unable to capture it.

(To be continued.)

NEW AFRICAN BEES.

By T. D. A. COCKERELL.

Anthophora domicola, sp. nov.

♀. Length about 13 mm.; anterior wing about 10; black, with hair of head and thorax above, apical margin of second abdominal segment, and the segments following entirely (except a few black hairs at base of second and third) rufo-fulvous; hairs of scutellum (except at extreme sides anteriorly), of metathorax, of first abdominal segment and of second except apical margin, black or brown-black, hair of cheeks and pleura and anterior legs white; of middle and hind legs black. Closely allied in all respects to *A. atrocincta*, Lep., but considerably smaller, with the wings pallid, suffused with brown along the veins, the reddish hair not so bright; and the lateral black areas of the clypeus indented below, the whole shaped like a boot with a sharp toe and a large heavy heel. The black areas of the clypeus are dull and granular, with rather sparse shallow punctures. The pygidial plate has dark hairs at its sides, but there is no black patch on the fifth segment, such as there is in *A. atrocincta*.

Hab. Benguella hinterland, West Africa, January, 1908; "from hole in side of mud house" (F. C. Wellman); Ekuiva Valley, West Africa, 1907 (F. C. Wellman). The latter specimen was at flowers of mint, together with *A. quadrifasciata*, Vill.

Anthophora ekuivensis, sp. nov.

♀. Length about 12 mm.; superficially just like *A. quadrifasciata*, but evidently distinct, by the following characters: mandibles stouter, only the basal third or less yellow; labrum with a central yellow lobiform area surrounded by black, and here rather elevated; median stripe of clypeus thorn-like, not reaching upper border; no light supra-clypeal mark; tegulae more shining; hind basitarsus entirely covered with white hair on outer side; ventral abdominal segments with long hair-fringes, which are fuscous in the middle and white laterally. The wings are dusky and subviolaceous.

Hab. Ekuiva Valley, West Africa, 1907 (F. C. Wellman).

Halictus jucundus benguellensis, subsp. nov.

♀. Agreeing with *H. jucundus*, Smith, from Willowmore, Cape Colony (Brauns), except that the wings are strongly dusky, and the

nervures and stigma are darker. The insect is larger than *H. virens*, Lep., from Bozen, Tirol (Fries), and differs, as Vachal has indicated, in the teeth of the hind spur. The metathoracic character mentioned by Vachal is scarcely distinctive for the *Benguella* form. Smith described *H. jucundus* from the Cape and Sierra Leone, but the former must be taken as the type locality, as it is given first, and the wings are described as hyaline, with the nervures and tegulæ pale testaceous. The measurement given by Smith for the female is at least 2 mm. too small for the *Benguella* insect.

Hab. *Benguella* hinterland, at flowers of an orchid, January, 1908 (Wellman); Ekuiva Valley, at flowers of *Geigeria*, 1907 (Wellman).

Halictus creightoni, sp. nov.

♀. Length about 8 mm.; anterior wing about $6\frac{1}{2}$; black, with dull white hair; abdomen black, with the hind margins of the segments concolorous; bases of segments 2 to 4 with bands of dense pure white tomentum, these all broad laterally, but narrowing medially, and failing dorsally on 2 and 3; tegulæ shining black; wings strongly dusky, nervures and stigma black; legs black, except claw-joints, which are reddish; hair of legs white, faintly yellowish on inner side of tarsi, brush at end of hind basitarsus dark fusco-ferruginous; spurs ferruginous; hind spur long, its apical half simple, the basal half with a row of minute nodules; apical region of abdomen with scattered coarse black bristles, the rima not distinguished by any colour. Hair at sides of face silvery; antennæ entirely black; face rather narrow; clypeus produced, with an irregular sculpture; front dull and granular; mesothorax with very little hair, dull, with scattered punctures; scutellum more shining, and quite closely punctured, the punctures of various sizes; area of metathorax with strong longitudinal wavy plications, its margin well-defined and sharp; abdomen moderately shining. Post-scutellum with greyish-white tomentum.

Hab. *Benguella* hinterland, West Africa, January 3rd, 1908 (F. Creighton Wellman). Taken, with numerous other bees (*Anthophora cærulea*, Fries, *A. convolvuli*, Ckll., &c.), from a small patch of flowering Compositæ, species of *Othonna* and *Geigeria*. This has a general resemblance to several European species; they are separable by the following table:—

Area of metathorax with a fine grooving or lineation; face very broad	<i>maculatus</i> , Smith.
Area of metathorax plicate or ridged	1.
1. Mesothorax very shiny, smooth, with sparse punctures	<i>morbillosus</i> , Kriechb.
Mesothorax not thus shiny and smooth	2.
2. Hair on post-scutellum long and fuscous; wings clear	<i>leucozonius</i> (Schrank).
Hair on post-scutellum short and greyish white; wings darkened	<i>creightoni</i> , Ckll.

BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES
ON THE HEMIPTERA.—No. 8.

BY G. W. KIRKALDY.

A.

I do not propose to reply in detail to Mr. Distant's recent criticisms (Entom. 1907, pp. 15 and 36), as the matter is not of interest to entomologists in general, and the facts and opinions are cited on both sides for hemipterists to choose from. Mr. Distant, however, implies that I employ a nomenclature of my own, and that my style of citation is incorrect.

In using "*Leptocoris*" I have simply selected the name which is proper under the rules followed by every living hemipterist but Mr. Distant, *viz.* priority. This name was proposed in 1833* by Hahn for a single species *rufus* (= *abdominalis*). Spinola in 1837 erected *Serinetha*, with type *abdominalis*, alleging at the time that *Leptocoris* was preoccupied by *Leptocoryza* (sic!). As a matter of fact *Leptocorixa* was founded by Berthold in 1827 (from the French form *Leptocorise* of 1825), altered by Latreille in 1829 to *Leptocorisa*. According to recognized rules, *Leptocoris* is not preoccupied by *Leptocorixa* or *Leptocorisa*. With regard to Mr. Distant's appeal to "authority," Dallas's work is nearly sixty years old, while Stål and Lethierry and Severin are notoriously indifferent to the principle of priority. It is because Bergroth is so "strict an observer of the law" that I feel sure he would now use *Leptocoris*.

Mr. Distant further says, "but it is inexact to write '*Serinetha*, Dist.'; he gives me too much credit." On looking at the context (Ent. xl. pp. 282-3), it will be seen that my note referred to omissions from the 'Fauna of India,' and the generic name in square brackets obviously was that under which the species would be found in Mr. Distant's index.

Another small point I may now refer to is that on p. 87 of vol. xl. (1907). Colonel Bingham states that the date 1830 for the text of the 'Coquille' was not corrected in print to 1838 till 1906, after the third volume of Mr. Distant's 'Fauna of India—Hemiptera' was in print. This is inaccurate, for the correction was published *four years* previously, *viz.* in the 'Entomologist' for 1902 (pp. 316-7), under a special heading.

II.

Family CIMICIDÆ.

Phlæophana, gen. nov.

Allied to *Phlæa*, Lep. & Serv., but differing by the juga being non-contiguous apically; the much longer labium; the much

* Not 1831, as Mr. Distant persists in citing.

longer scutellum, differently formed corium and membrane. Type, *Phléa longirostris*, Spin.

In the 'Fauna of India—Hem. I.' Mr. Distant cites *lineolatus* as the type of *Podisus*, and in this he has unfortunately been followed by Schouteden (Gen. Ins.).

Podisus was founded by Herrich-Schaffer in the 'Wanzen-artigen Insecten,' ix. 296, without mention of species. On p. 338 he describes five species, viz. *punctipennis*, *strigipes*, *vittipennis*, *pallipes*, and *albiseptus*. The first general treatment was apparently that of Stål in 1870. In that *punctipennis* is placed under *Apateticus*; *vittipennis* under *Podisus*; *pallipes* as uncertain; *albiseptus* under *Tynacantha*; *strigipes* under *Mineus*. I think, therefore, that the type of *Podisus* is *vittipennis* (= *bifidus*).

Montrouzierellus, n. n. = *Platynopus*, subgen. || *Acanthomera*, Montr. (type, *melacanthus*).

Austromalaya, n. n. = || *spudæus*, Stål.

Glaucias, n. n. = || *Zangis*, Stål.

Bæria, n. n. = || *Panda*, Distant.

Family CIGADIDÆ.

Psalmocharias, n. n. = || *Sena*, Distant.

There are several points of nomenclature on which I have not answered criticisms as yet. These will be dealt with in detail in the Introduction to the first volume of the 'Catalogue of the Hemiptera' now in the press.

DESCRIPTION OF A NEW SPECIES OF SAWFLY (*SELANDRIA*) FROM BORNEO.

By P. CAMERON.

Selandria kuchingensis, sp. nov.

Black, shining; the apex of the femora narrowly, the basal three-fourths of the tibiæ, and the tarsi white; wings iridescent, hyaline, distinctly suffused with fuscous; the costa, stigma, and nervures black, the costa thicker than usual, the first transverse cubital nervure very faint, almost obliterated; the transverse radial nervure has the lower half bullated; the second recurrent nervure is received at the apex of the basal fourth of the cellule. Head and thorax bearing a short white pile. ♂. Length, 4 mm.

Kuching, Borneo; May (John Hewitt).

Basal joints of antennæ fuscous, the third as long as the fourth and half of the fifth, the fifth, sixth, and seventh dilated, thicker than the apical pair. Frontal area large, raised, widened towards the apex, the top enclosing the lower ocellus. A stout keel between the antennæ. Clypeus opaque, shagreened, its apex broadly transverse.

Palpi clear white. Mesonotum distinctly trilobate, the middle lobe with a deep furrow down the centre. Cenchri large, clear white. The dorsal middle segments of the abdomen are fuscous. Calcaria short, testaceous. The first joint of the hind tarsi is blackish-fuscous, narrowly white at the base and apex, the second is testaceous, blackish above, the third and fourth black, the fifth black, white at the base.

NOTES ON BRITISH BRACONIDÆ.—VI.

By CLAUDE MORLEY, F.E.S., &c.

(Continued from vol. xl. p. 254.)

METEORIDÆ.

THIS small subfamily consists of some thirty species, which so closely resemble the ichneumonidous *Hemiteles* in the structure of their petiolated abdomen, &c., that I found an individual of the latter genus among them, while working on this paper, in my collection; it also is related to the Euphoridæ, among Braconids, though its possession of three cubital cells will at once distinguish it therefrom. Its species are mainly parasitic on Lepidoptera, sometimes socially but usually solitarily: one, I shall show, has been bred from a sawfly, and several are reputed to prey upon beetles; while *M. obfuscator* is constantly being bred by coleopterists from the heteromerous *Orchesia micans* in Boleti on elm trees. The following table will sufficiently distinguish our species, many of which appear at first sight very obscure, but become easily recognized with a little practice; and the last four or five are, perhaps, but varieties of the same. There is but one genus:—

METEORUS, Hal.

- | | | |
|------|--|-----------------------------------|
| (44) | 1. Post-petiole discally bisulcate at the base. | |
| (5) | 2. Radial cell of lower wing divided by a transverse nervure | (ZEMITES, Först.). |
| (4) | 3. Costal and median cells of upper wing of subequal length | 1. <i>albiditarsis</i> , Curt. |
| (3) | 4. Costal cell distinctly shorter than the median | 2. <i>caligatus</i> , Hal. |
| (2) | 5. Radial cell of lower wing not divided. | |
| (7) | 6. Costal cell as long or longer than median (PROTELUS, Först.). | 3. <i>chrysophthalmus</i> , Nees. |
| (6) | 7. Costal cell shorter than the median. | |
| (33) | 8. Recurrent nervure emitted before apex of first cubital cell. | |
| (12) | 9. Antennæ with at least thirty-five joints. | |
| (11) | 10. Post-petiole twice longer than apically broad: abdomen longer. | 4. <i>deceptor</i> , Wesm. |

- (10) 11. Post-petiole decidedly shorter; abdomen also shorter 5. *pallidus*, Nees.
- (9) 12. Antennæ with at most thirty joints.
- (20) 13. Stigma unicolorous, flavidous or testaceous.
- (15) 14. Face piceous or black; legs often infuscate 6. *tabidus*, Wesm.
- (14) 15. Face testaceous or rufescent.
- (19) 16. Sternauli deep; antennæ of female thirty-two jointed.
- (18) 17. Antennæ infuscate or piceous 7. *pallidipes*, Wesm.
- (17) 18. Antennæ flavidous or testaceous 8. *ictericus*, Nees.
- (16) 19. Sternauli shallow; antennæ of female twenty-seven jointed 9. *confusus*, Ruthe.
- (13) 20. Stigma piceous or infuscate, usually paler basally.
- (22) 21. Legs broadly infuscate 6. *tabidus*, supra.
- (21) 22. Legs testaceous.
- (30) 23. Wings not clouded; second cubital cell not contracted towards radial nervure.
- (29) 24. Wings not lacteous; abdomen usually pale-marked.
- (26) 25. Metathorax smooth 10. *vexator*, Hal.
- (25) 26. Metathorax rugulose (not punctate).
- (28) 27. Head broader than thorax; stigma larger and darker 11. *obfuscatus*, Nees.
- (27) 28. Head not broader than thorax; stigma smaller and paler 12. *punctiventris*, Ruthe.
- (24) 29. Wings lacteous; abdomen nearly totally black 13. *atrator*, Curt.
- (23) 30. Wings clouded; second cubital cell distinctly contracted above.
- (32) 31. Second cubital cell strongly contracted, subtriangular 14. *albicornis*, Ruthe.
- (31) 32. Second cubital cell less contracted, trapeziform 15. *abdominator*, Nees.
- (8) 33. Recurrent nervure emitted at or beyond apex of first cubital cell.
- (35) 34. Length, 2½ mm.; terebra longer than abdomen 16. *jaculator*, Hal.
- (34) 35. Larger; terebra not longer than abdomen.
- (39) 36. Stigma piceous, sometimes externally pale.
- (38) 37. Stigma unicolorous piceous 17. *melanostictus*, Cap.
- (37) 38. Stigma paler, with the outer border stramineous 18. *pulchricornis*, Wesm.
- (36) 39. Stigma pale, with the border sometimes darker.
- (41) 40. Terebra as long as the abdomen; male unknown 19. *consors*, Ruthe.

- (40) 41. Terebra shorter than the abdomen.
 (43) 42. Body broadly marked with black, especially the metathorax . . . 20. *scutellator*, Nees.
 (42) 43. Body entirely testaceous, basal segment at most infusate . . . 21. *unicolor*, Wesm.
 (1) 44. Post-petiole not discally bisulcate, though often aciculate.
 (46) 45. Wings short, narrow and clouded, white below stigma . . . 22. *micropterus*, Hal.
 (45) 46. Wings normally developed and hyaline.
 (48) 47. Petiole white or paler than post-petiole . . . 23. *versicolor*, Wesm.
 (47) 48. Petiole not pale, usually black.
 (56) 49. Stigma piceous and internally pale.
 (53) 50. Head broader than thorax; terebra as long as abdomen.
 (52) 51. First abscissa of radial nervure much shorter than the second . . . 24. *profligator*, Hal.
 (51) 52. First abscissa of radial nervure as long as second . . . 25. *flator*, Hal.
 (50) 53. Head narrower than thorax; terebra shorter than abdomen.
 (55) 54. Petiole shorter than post-petiole . . . 26. *cinctellus*, Nees.
 (54) 55. Petiole as long as the post-petiole . . . 27. *tenellus*, Marsh.
 (49) 56. Stigma entirely pale.
 (60) 57. Antennæ at most twenty-eight jointed, of female filiform.
 (59) 58. Body testaceous, with only the abdomen basally infusate . . . 28. *rubens*, Nees.
 (58) 59. Body mainly black, centre of abdomen pale . . . 29. *læviventris*, Wesm.
 (57) 60. Antennæ at least thirty-jointed, of male and female setaceous.
 (62) 61. Abdomen black, with at most second segment pale-marked . . . 30. *fragilis*, Wesm.
 (61) 62. Abdomen mainly, or body entirely, testaceous . . . 31. *luridus*, Ruthe.

1. *albiditarsis*.—An abundant species. I have it from Inveruglas, Scotland (Dalglish); New Forest (Miss Chawner); Bentley Woods, near Ipswich (Elliott); Guestling, near Hastings, in 1876 and 1889—the females misnamed *Zele testaceator* by Bridgman—(Bloomfield). I have several times taken the females flying round young trees about Ipswich, and beaten the males both there and at Wilverley, in the New Forest. It is on the wing from May 16th till July 1st. Marshall gives no authority for his statement that the cocoon—which he correctly describes as woolly, spindle-shaped, dirty yellow, with a very tough leathery lining—is attached to leaves. On the contrary, Wigin sent me, on November 18th, 1899, thirteen which he had dug up from beneath the surface of his garden at Methley,

Leeds, with those of *Exetastes cinctipes* and *E. illusor*; he said that in all probability they had emanated from *Mamestra brassicæ* or *Hadena oleraceæ*. Of the thirteen I can only find that six (all males) emerged between May 28th, 1900, when one was out at 10 a.m. since midnight, and June 18th, 1900, when three had emerged since 6th. The last emerged between 2 p.m. on June 3rd and 11 p.m. the preceding night. On October 31st, 1900, he sent me twenty more cocoons similarly obtained, and from these but five imagines emerged; both sexes on May 26th, 1901, between midnight and 11 a.m., a male on 29th, and both sexes on June 2nd between midnight and 10 a.m. Clutten has bred it at Burnley; Blair as early as May 10th; and Bignell in Devon from *Hadena suasa*. On May 13th, 1904, Blair bred a single female from a "whole batch" of New Forest *Tæniocampa miniosa*, among a number of *Meniscus murinus* (cf. my 'Ichneumons of Britain,' vol. iii.). He particularly informs me that the cocoon is spun underground. Marshall could cite no specified hosts.

2. *caligatus*.—This appears to me to differ from *M. deceptor* only in the faintly defined dividing nervure. It is restricted to Britain. I have only three males, taken by Miss Chawner in the New Forest; Dr. Capron about Shere, in Surrey; and myself by beating *Prunus spinosa* at Barham Green (William Kirby's parish) on May 27th, 1899.

3. *chrysophthalmus*.—Both sexes bred on May 20th, 1903, from *Nephopteryx hostilis*, taken in South Essex during the preceding autumn (Thurnall); one female bred from *Phlyetenodes turbidalis* at La Granja, in Spain (Chapman). In the latter case the parasite had emerged from the larva after the latter had constructed its cocoon and spun its own within that of the host; the former is pure white, dull, subcylindrical, and not very rough; from it the imago emerged at the smaller apex, which was entirely cut round, but held *in situ* by the wool. Unlike the foregoing species, this is abroad in the autumn as well as the spring, since I swept a female at Freston, in Suffolk, on September 7th, 1896. It has also occurred to me at Bentley and Brandon in the same county in late May and early June, to Miss Chawner in the New Forest, and to Charbonnier at Bristol in July.

4. *deceptor*.—A common species, whose larva spins its cocoon within that of its host; the former is pure white and similar in consistency to that of the last species, but a great deal more attenuate at one end. Tonge, however, tells me that he found a cocoon free on Scotch fir in a Reigate garden in October, from which this species emerged on 5th of the following July. It has also been bred by Porritt in Yorkshire, and Clutten at Burnley; Felden, in Herts (Piffard); Tuddenham Fen, in Suffolk (E. G. J. Sparke); New Forest, at the end of May (Adams); and Guestling

(Bloomfield). I took a female at Ringstead, in Norfolk, as late as August 23rd, 1906.

6. *tabidus*.—I have five specimens appearing to belong to nothing but this species, which is said to prey upon Longicorn beetles. Three were bred by Mrs. Holmes at Sevenoaks in 1906 from *Eupithecia minutata*, and had spun white or pale ochreous cottony, cylindrical cocoons of 5 mm. in length, from which one failed to emerge, and had, as the Parasitica often do in such cases, died with its head inwards; one female was captured by Wilson Saunders at Reigate in July, 1872; and I took the last on bracken at the Wilverley Enclosure, near Brockenhurst, June 14th, 1907.

(To be continued.)

NOTES AND OBSERVATIONS.

THE ENTOMOLOGICAL SOCIETY OF AMERICA.—The third meeting of the Entomological Society of America was held at the University of Chicago, December 30th and 31st, 1907, in affiliation with the American Association for the Advancement of Science, and other societies. About one hundred were in attendance, coming from as widely remote localities as Maine and California, Ottawa and Louisiana. On Monday sessions were held for the reading of papers, among which were the following:—

“Notes on the Geographical Affinities of the Isle Royale, Lake Superior” (an outline of the relations of the Isle Royale fauna (beetle fauna) to that of Northern North America. General remarks on the major faunal centres based on beetles), by Charles C. Adams. “Some Problems in Nomenclature” (a brief discussion of the validity of names, particularly those bestowed on insect galls and larvæ), by Dr. E. P. Felt. “Stereoscopic Photography Applied to Entomological Subjects” (exhibition of excellent stereoscopic effects brought about by an ingenious but simple apparatus), by Professor F. L. Washburn. “Is Mutation a Factor in the Production of Vestigial Wings among Insects?” (a summary of some observations among insects belonging to various groups, where the evolution of wingless or subapterous species can be traced within a genus or small group), by Charles T. Brues. “The Mouth-parts and Phylogeny of Siricidæ,” by J. Chester Bradley. “On Certain Structural Characters of the Genus *Catocala*,” by W. Beutenmuller. “Is *Vespa borealis* an Inquiline?” (an account of finding males and females of *Vespa borealis* living in the nest of *V. diabolica* on several occasions, apparently on perfectly friendly terms), by Dr. James Fletcher. “The Entomological Society of America and its Work,” by Henry H. Lyman. “The Habits of the Crane-Fly, *Dicranomyia defuncta*, O. S.,” by James G. Needham. “The Life-History of a Bee-Fly (*Spogostylum anale*, Say); the Larvæ Parasitic on the Larvæ of a Tiger Beetle (*Cicindela soutellaris*, Say)” (the eggs are laid in July and August; larvæ on the last larval stage of the

host in the spring; when the host makes its pupal cell and the internal parts become semi-fluid, the parasite moults and grows very rapidly, completely destroying the host (July). The pupa digs toward the surface by wriggling movements of the body, and the adult emerges when the surface is reached. Title only), by Victor E. Shelford. "Ancestral Ephemeridæ from the American Permian Formation" (a group of true Ephemeridæ obtained from the Permian of Kansas. The earliest known true Ephemerids, and, with the exception of a few Russian specimens, all that are known from the Permian. They present a distinct early stage in the evolution of the Ephemerid line), by Dr. E. H. Sellards. "Observations on the Life-History and Adaptation of a New Semi-aquatic Aphid" (habits, life-history, and specialization of *Aphis aquaticus*, novus, found on the water-thyme; many remarkable adaptations to its semi-aquatic life), by C. F. Jackson. "Habits of the Larvæ of *Lycæna*," by J. H. Cook.

On Monday evening the Annual Address was given before the Society by Professor Herbert Osborn, of the Ohio State University, his subject being "The Habits of Insects as a Factor in Classification." The address was followed by a most enjoyable smoker, at which the members of the Society and their friends were the guests of the Entomological Section of the Chicago Academy of Sciences.

MELITEA PARTHENIE VAR. VARIA: A CORRECTION.—The statement on p. 57 of the current volume by me that *M. parthenie* var. *varia* was met with is a mistake, the specimen referred to being only a slightly under-sized dusky form of *M. parthenie*. Mr. Wheeler tells me that the true "*varia*" does not occur in the immediate vicinity of Bérissal. R. M. PRIDEAUX; "Woodlands," Brasted Chart, near Sevenoaks.

A FEW NOTES ON BREEDING EXPERIENCES IN 1907.—Before writing my notes a short description of my breeding apparatus will make them more readily understood. I have for ova and newly-hatched larvæ three-inch glass-lidded metal boxes; for small broods and intermediate stages glass candle-chimneys (such as are used to protect candles from the wind) stuck into a perforated zinc rim, which in turn is embedded in a four-inch flower-pot filled with a mixture of peat and sand, and in the centre a small phial for food-plant. For larger broods and larger larvæ, two horticultural bell-glasses inserted in their stands, three or four small bread-pans or pork-crocks filled with peat and sand to the depth of the glass phials, and three or four large-sized deep flower-pots; besides sleeves innumerable. All above except metal boxes are covered with tiffany.

Anticlea rubidata.—Female, captured July, 1906; ova laid freely, and hatching produced healthy larvæ, which fed on bedstraw; were only moved once, from box to bell-glass, and were no trouble at all. Bedstraw being difficult to put in water and also to remove, I contented myself with just putting fresh food on the top of the old every other day. Very successful, and a fine emergence in July, 1907. This insect must be bred to get it at its best.

Lophopteryx camelina.—A very early female, taken at rest April, 1907, deposited about thirty ova; the larvæ were sleeved when about

a fortnight old on birch, and fed up fairly well. Several died, but twelve to eighteen pupated in cocoa-nut fibre placed in box in sleeve, and the moths successfully emerged in August.

Odontotia carmelita.—Having obtained three pupæ from Mr. Newman, of Bexley, I was agreeably surprised to find both a male and female emerge together one fine morning in April. When placed in a candle-chimney cage covered with tiffany they paired at about sunset, and some fifty ova were subsequently obtained. Having been advised to sleeve the larvæ, I did so about ten days after hatching, but all gradually sickened and died, the last succumbing when about half-grown in late July. Three friends had some of these larvæ, and all were equally unsuccessful. It has been suggested to me that the reason for failure was the honeydew on the leaves caused by aphides, which were very numerous. This seems feasible, as other species fed and sleeved on same birch likewise sickened, though some did fairly well, as *falcula* and *camelina*. Can any reader throw out a suggestion?—HAROLD E. WINSER; Kent House, Cranleigh, Surrey.

CAPTURES AND FIELD REPORTS.

NOLA ALBULALIS IN SUSSEX.—About the end of July, 1906, a specimen of *Nola albulalis* was taken by my brother Geoffrey at the foot of the Downs near Lewes. Owing to his having done very little entomology since that time the insect has only just been identified.—HUGH J. VINALL; Torbay, Park Road, Lewes, April 23rd, 1908.

HERMINIA DERIVALIS NOT AT BARMOUTH OR CHESTER.—For *Herminia derivalis* at Barmouth (Entom. xxxviii. p. 292), and at Chester (xli. p. 66), read *Zanclognatha grisealis* = *nemoralis*.—J. ARKLE; Chester.

LEPIDOPTERA OF EAST SUTHERLAND.—The following list is supplementary to that published (Entom. xl. p. 40):—*Selenia bilunaria* (*illumaria*), sparingly; *Odontoptera bidentata*, sparingly (very dark forms); *Amphidasya betularia*, fairly common (normal forms), out of many larvæ bred no black forms occurred; *Demus coryli*, fairly common; *Cidaria miata*, sparingly; *Hypsipetes trifasciata* (*impluvnata*), common; *Hadena thalassina*, sparingly; *Cymatophora duplaris*, fairly common; *Coremia designata*, sparingly. Total of previous list of species 98, new additions as above 9=107 species.—M. A. ROLLASON; Jan. 1st, 1908.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Wednesday, March 18th, 1908.—Mr. C. O. Waterhouse, President, in the chair.—Mr. Edwin Goldthorp Bayford, of 2, Rockingham Street, Barnsley; Mr. Edgar L. Clark, of Congella, Natal; Mr. G. W. Jeffrey, of the Alpine Gold Mining Company, Barberton, Transvaal Colony; Mr. G. W. Lawn, of Tudor House, Wealdstone, Harrow; and Mr. D. Langsdon, of 20,

Holland Park, W., were elected Fellows of the Society.—Dr. T. A. Chapman exhibited photographs of the empty egg-shells and young larvæ of *Papilio homerus*.—Mr. C. J. Gahan, a larva of the genus *Trictenotoma*. This larva belonged undoubtedly to the Heteromera, and bore most resemblance to the larvæ of Pyrochroidæ and Pythidæ. He also showed a larva of *Dascillus cervinus* from Ireland, which had been received at the Natural History Museum by Mr. Waterhouse, a species little known in this stage. The President said that the larva in question was just now the subject of experiment, it being reported as doing much damage to grass-land. It was important, therefore, to determine whether it was really destructive or parasitic on some other pest like *Melolontha*.—The President exhibited a photograph drawing of the larvæ of *Coniopteryx*, a small neuropteran common enough in its perfect state, but rarely found as a larva, when it may be beaten out of fir-trees.—Mr. W. J. Kaye, three species of *Pereute* from the Chanchamayo district of Peru, viz., *P. leucodrosime*, *P. calvinice*, and *P. callianira*, together with specimens of the Nymphaline *Adelpha lara*. He called attention to the fact that these Pierines and Nymphaline occurred together at an elevation of from 2500 to 3000 ft. It was wrong to suppose that any *Heliconius melpomene*-like species entered the association, as *Heliconius* species of this pattern did not ascend to such an elevation, or, if they ever did, it was only as a rare exception.—Mr. L. W. Newman, a long and varied series of *Smerinthus populi*, bred from wild Bexley parents in June, 1907, the series ranging from extreme dark specimens (about six per cent.) to very light (about ten per cent.), and pink-shaded or tinged (about twenty per cent.), the remainder being intermediate forms. They included three gynandromorphic specimens.—Mr. J. W. Tutt asked for information from any Fellows who had collected abroad, relative to a suggested distinction of species in *Everes argiades*, Pall. He said that the question had been raised by M. Oberthür whether we have under *ab. coretas*, O., and *argiades* two separate and distinct species. A discussion followed, in which the Rev. G. Wheeler, Dr. T. A. Chapman, Mr. H. Rowland-Brown and other Fellows took part. Fellows having specimens in their collections were asked to bring series for comparison and discussion.—Mr. C. J. Gahan communicated a paper: "On the Larvæ of *Trictenotoma childreni*, Gray, and *Melittomma insulare*, Fairmaire."

April 1st.—Mr. C. O. Waterhouse, President, in the chair.—Mr. F. B. Ackerley, P.O. Box, 459, Port Elizabeth, South Africa; Mr. Charles G. Clutterbuck, Heathside, Heathville Road, Gloucester; Mr. P. A. Clutterbuck, Indian Forest Department, Naini Tal, United Provinces, India; Mr. Walter W. Froggatt, F.L.S., Government Entomologist, New South Wales; Mr. H. A. Nurse, Botanical Department, Trinidad, B.W.I.; Mr. William Boulton Pratt, 10, Lion Gate Gardens, Richmond, Surrey; Mr. Edward Richard Speyer, Ridgehurst, Shenley, Herts, and New College, Oxford; Mr. G. Talbot, Vine Cottage, Raleigh Road, Enfield, N.; and Dr. F. Creighton-Wellman, Cuidado de Senhores Silva & Lopes, Benguela, Africa Occidental, were elected Fellows of the Society.—Mr. F. B. Jennings exhibited, on behalf of Mr. R. A. R. Priske, a melanic aberration of the stercorarius beetle *Aphodius scybalarus*, Fabr., taken at Deal in

June, 1907.—Professor E. B. Poulton, F.R.S., for Mr. E. E. Green, a preparation for the microscope of the tongue of *Ochromyza jejuna*.—Mr. E. R. Banks sent, for exhibition, four specimens of *Hepialus humuli*, L., more or less covered by a sprouting fungoid growth, which was said by the editor of the 'Field' newspaper, in 1880, to be possibly an early stage of a species of *Clavaria*, and to have attacked the moths after death. Mr. Banks had only met with eight lepidopterous imagines thus affected, all of which appeared to be referable to *H. humuli*. (2) Many dead larvæ of *Hepialus lupulinus*, L., infested with the fungus *Cordiceps entomorhiza*, and received from Mr. W. H. B. Fletcher, in whose flower-garden at Bognor they had been found. The larvæ of this species prove destructive there, feeding on the roots of *Helleborus*, *Iris*, *Pæonia*, but the infested larvæ were only obtained from clumps of *Pæonia officinalis*. The larvæ were of two classes, some showing anteriorly much fibrous net-like mycelium growth, accompanied by a drumstick-like process often more than half the length of the larva; others showing no fungoid growth externally, and these work completely out of the soil and lie about on the surface.—Mr. J. E. Collin communicated "The Systematic Affinities of the Phoridae and of several Brachycerous Families in the Diptera," by Mr. W. Wesche, F.R.M.S.—Dr. T. A. Chapman, M.D., F.Z.S., read a paper on "*Stenoptilia grandis*, n. sp."—H. ROWLAND-BROWN, *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*March 12th*, 1908.—Mr. A. Sich, F.E.S., President, in the chair.—Mr. R. Adkin exhibited the Tortrices, *Hedya acerana*, *H. ocellana*, *Grapholitha minutana*, and *Semasia woeberiana*, as common Metropolitan species, taken by him from fences on his way to and from the station.—Mr. Hy. J. Turner, four specimens of *Stichophthalma howqua*, a large species of Morphine from Southern China, and specimens of the West African *Precis artaxia*.—Mr. Hugh Main, females of several species obtainable at the present time, with their ova, viz., *Hybernia progemmaria*, *Anisopteryx æscularia*, and *Phigalia pedaria*.—Mr. Andrews, the Diptera, *Pipiza lugubris*, a scarce Syrphid, and four examples of *Caricia tigrina* with its prey.—Mr. Joy, a collection of butterflies made by him near Calcutta during the last two seasons, and read notes.—Mr. Stanley Edwards, two species of scorpion, *Heterometrus swammerdami*, from India, and *Tityus insignis*, from the West Indies.

March 26th.—Mr. A. Sich, F.E.S., President, in the chair.—Mr. Browne exhibited a large store-box of British Lepidoptera which he was presenting to the Society.—Mr. Tonge, some Lepidoptera recently received from Australia, including *Pyramis kershawii*, and also a living specimen of *Xylocampa areola* (*lithorhiza*) taken that day.—Mr. R. Adkin, a series of *Scoparia truncicolella*, taken at Oxshott on pine-trunks.—Dr. Chapman, a living, nearly full-fed larva of *Aricia agestis* (*astrarche*), which had fed up indoors. Dr. Hodgson, sketches of the resting attitude of *Adopæa flava* (*thamias*), and read notes.—Mr. Turner, some two dozen species of butterflies characteristic of Sierra Leone and West Africa, including several species of *Euphaedra*, *Aterica*, and *Acræa*, *Hypolimnas egesta*, *Anauris*

niavrus, *Mylothris rhodope*, *Lachnoptera, iole*, *Salamis anacardi*, *Precis octavia*, *Catuna canobita*, *Vanessa harmonica*, &c.—Mr. Sich exhibited and read notes on the section of the genus *Tinea*, containing *T. fulvimitrella*, *T. arcella*, *T. corticella*, *T. parasitella*, *T. picarella*, *T. granella*, *T. cloucella*, *T. albipunctella*, *T. caprimulgella*, *T. nigripunctella*, and *T. confusella*.—HY. J. TURNER, *Hon. Rep. Secretary*.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meeting held *February 17th*, 1908, at the Royal Institution, Colquitt Street, Liverpool.—R. Wilding, Esq., in the chair.—Mr. W. Mansbridge, F.E.S., read a paper entitled "Variation in Lepidoptera," in which he enumerated the different classes of variation as generally understood by lepidopterists, and referred especially to a phase of variation which has not evoked the amount of interest its importance warrants, *viz.* colour changes from yellow or ochreous to red or brown and modifications of these.—The author considered these variations as proceeding upon parallel lines to melanism and probably arising in a similar way; first by variation from a commonly occurring form in the Darwinian sense, and secondly by mutations or sudden leaps in the sense enunciated by De Vries.—Putting on one side the first as more or less affecting all species, the author showed how practically all definite melanic forms falling in the second class (of which we have records) have, when first noticed, been of very local occurrence—as the majority still are—a few only having spread in comparatively recent times over large areas, and noted when this had been the case that the particular species, e.g. *Tephrosia biundularia* var. *delamereensis*, *Amphidasys betularia* var. *doubledayaria*, *Hybernica marginaria* var. *fuscata*, and *Diurnea fagella*, black forms, are common and generally distributed, so that transported specimens could easily continue their race wherever they might be carried.—The author broadly classes all instances of melano-chroism and leuco-chroism as Darwinian modifications, and all cases of melanism and albinism as well as yellow to red, or red to yellow, and similar changes where the break is sudden, as mutations or De Vriesian variations, and concludes that they have arisen in this way and then increased and spread, or *vice versa*, accordingly as local conditions were favourable or the reverse.—A capital exhibition of varieties of local forms of Lepidoptera was made by the members in illustration, and a discussion ensued, in the course of which Messrs. F. N. Pierce, Dr. J. Cotton, Dr. Tinne, Robert Tait, junr., Dr. Wm. Bell, and R. Wilding concurred generally in the views set forth in the paper.

March 15th, 1908.—Mr. R. Newstead, A.L.S., Vice-President, in the chair.—The evening was devoted to an exhibition of *Boarmia repandata* and its varieties. Long series of the moth from various localities, chiefly from the North of England and from Wales, were shown by Mr. Robert Tait, junr., Mr. C. F. Johnson, and Mr. Wm. Mansbridge. The rich dark mottled forms from Delamere Forest; the greyish-white blotched race with the locally rare melanic aberration, also with white blotches, from Penmaenmawr; melanic varieties from Mansfield and Huddersfield; as well as absolutely black aberrations from Knowsley, Lancashire; the common London forms from Epping Forest and Wimbledon; var. *conversaria* from North Cornwall and New

Forest; besides series of pale-coloured moths from various localities were all represented in the above exhibits. A discussion ensued in which the members gave their experiences with *B. repandata*.—Mr. Tait stated that in breeding from extreme forms about seventy-five per cent. followed the parents, but pointed out that he had found it difficult to get black varieties to pair. He also remarked how closely the predominating pale form from North Wales resembled the bare rocks upon which it rested in the daytime.—Mr. Johnson, in his series from Maer Wood and Burnt Wood, Staffs, remarked on the great difference shown by the species in these two localities, only four miles apart; those from the former locality being chiefly very dark greyish-black, while the latter place gave a lighter and much browner form.—Mr. Charles Capper, London, sent a series of *B. repandata* from Wimbledon, and a series of *H. leucophaæaria* from Richmond Park for exhibition.—Mr. Newstead brought four drawers showing the life-history of the Tsetse Flies (*Glossinæ*), being the unique series of these flies from the museum of the Liverpool School of Tropical Medicine. This very interesting exhibit attracted a large amount of attention, and, in answer to questions, Mr. Newstead alluded to the chief points in the economy of these flies.

April 13th.—Mr. R. Newstead, A.L.S., in the chair.—The chairman delivered a lecture entitled "The Bionomics of Mosquitoes," in which he dealt with the subfamilies *Anophelinæ* and *Culiciniæ*; he described the *Anopheline* genera *Anopheles* and *Pyrethrophorus*, contrasting them with the *Culicine* genera *Culex* and *Stegomyia* in a very clear and thorough manner. Mr. Newstead illustrated the lecture by blackboard drawings and by the following exhibits:—Living larvæ and pupæ of *Corethra* and *Culex*: a case showing the complete life-history and distribution of *Stegomyia calopus*, the mosquito which transmits yellow fever; and the following species concerned in carrying filariæ, which not uncommonly cause the condition known as elephantiasis, viz. *Culex fatigans*, *Pyrethrophorus costalis*, *Myzomyia rossi*, *Mansonia africana*, and *Stegomyia fasciata*. The remainder of the evening was devoted to an exhibition of *Hydræcia nictitans*, *H. lucens*, and *H. paludis*, most of the members present having brought their series of these moths. The discussion was opened by Mr. F. N. Pierce, who showed preparations of the genitalia of the three species named above under the microscope, as well as of the new species brought forward by the Rev. C. R. N. Burrows, of Mucking, at a recent meeting of the City of London Entomological Society. Mr. Pierce demonstrated that the genital ancillaries are markedly different, and fully support the view that we really have four distinct species confused under the name *nictitans*. Mr. Pierce also showed photographs of genitalia of *Retinia buoliana* and *R. pinicolana*, clearly proving these two insects to be distinct.—Other exhibits were:—Mr. W. Mansbridge, a series of *Zygæna achilleæ* from Argyll, with *Z. minus*, from Wales, for comparison. Mr. F. N. Pierce also showed *Z. achilleæ*, from the Continent, with many other species of the genus.—Mr. W. A. Tyerman, a bred series of *Amphidasys strataria*, from Delamere, the females especially being very dark and heavily banded.—Mr. Mounfield, of Warrington, in addition to his very fine series of *H. nictitans*, *lucens*, and *paludis*, a very dark brown form of *Drepana falcula*, pale

and dark forms of *Hadena adusta* and *Macaria liturata* var. *nigrofulcata*, all from Delamere; also varieties of *Abraxas grossularata* from Warrington. — H. R. SWEETING & WILLIAM MANSBRIDGE, *Hon. Secs.*

RECENT LITERATURE.

1. *Annals of Tropical Medicine and Parasitology* (Series T. M. vol. i. No. 3). University of Liverpool. November, 1907. This is an excellent number, containing twenty-three beautiful plates (sixteen coloured), and illustrations in the text. Though no paper deals with insects directly, some of their parasites (Trypanosomes, for instance) are treated of.
2. *Dragonflies (Odonata) collected by Dr. D. H. Atkinson in New-foundland, with Notes on some Species of Somatochlora*. By E. B. Williamson ('Entomological News,' April, 1906). Two good plates accompany the paper.
3. *Copulation of Odonata*. By E. B. Williamson ('Entomological News,' May, 1906). This paper contains an excellent plate.
4. *Dragonflies (Odonata) of Burma and Lower Siam.—II. Subfamilies Cordulegasterinae, Chlorogomphinae, and Gomphinae*. By E. B. Williamson (Proc. of U. S. Nat. Museum, December 18th, 1907). This is not a mere list; it contains good notes, especial attention being given to wings and wing-venation. Part I., on the *Calopteryginae*, was published in 1904.
5. *On some Earwigs (Forficulidae) collected in Guatemala by Messrs. Schwarz and Barber*. By A. N. Caudell (Proc. U. S. Nat. Museum, October 23rd, 1907).
6. *Notas Zoológicas*. By R. P. Longinos Navás, S.J. (Boletín de la Sociedad Aragonesa de Ciencias Naturales), November and December, 1907. An illustrated paper on eight new Spanish insects or varieties. The descriptions are in Latin.
7. *Tricópteros nuevos*. By R. P. Longinos Navás, S.J. (Boletín de la Real Sociedad española de Historia Natural), December, 1907. Illustrated Latin descriptions of three new caddis-flies (not Spanish).
8. *Neuróptero nuevo de Montserrat*. By R. P. Longinos Navás, S.J. ('Revista Montserratina'), December, 1907. An illustrated Latin description, with notes in Spanish, of *Psocus hilaris*, Nav.
9. *Neurópteros nuevos*. By R. P. Longinos Navás, S.J. ('Memorias de la Real Academia de Ciencias y Artes de Barcelona'), Barcelona, 1908. A copiously illustrated paper of twenty-five pages. Though the notes are in Spanish, the author has again favoured us with Latin descriptions of the twenty-nine new species treated in the paper. Nearly all belong to the Planipennia.

W. J. LUCAS.

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THE *ATHALIA* GROUP OF THE GENUS *MELITÆA*.

BY GEORGE WHEELER, M.A., F.E.S.

WITH the possible exception of the black-and-white "skippers," there is probably no group of European butterflies which causes more difficulty than those species of the genus *Melitæa* which are usually grouped round *athalia*. No doubt it is, as a rule, easy enough for any one with a slight acquaintance with the various species to separate them, when the individuals are few in number and the localities restricted; but when long series from many and widely separated localities are examined (and frequently with only fragmentary data, or none at all, attached to them), the difficulty of separating the species and of naming all specimens correctly becomes almost insuperable. For this difficulty two principal causes are responsible: first, the close resemblance *inter se* of the different species, and, secondly, the very great range of variation in each species, though always within certain definite limits. But it is the combination of these two difficulties which makes this group of almost unequalled biological interest amongst European butterflies; for we have here exactly the condition of things which was long ago laid down by Darwin ('Origin of Species,' chap ii.) as that in which it is easiest to see species as it were in the making. If species have been evolved from previously existing ones, it would be a most remarkable circumstance if we could find no examples of the process taking place under our eyes; yet the majority of collectors (if not even of naturalists) who give an unhesitating assent to some theory of evolution, seem to expect to find it possible in all cases to say with certainty to what species any given insect belongs; disregarding in practice the possibility, nay, the extreme probability, that amongst the number of the European butterflies, many of which are very variable, some few may be expected to exhibit the process of species-making, or, in other words, to afford instances of species not yet absolutely differentiated from each other, and to certain individuals of which it is therefore impossible to assign with certainty the correct

name. I believe this to be the case with the genus *Melitæa*, and pre-eminently so with that group of it associated with *athalia*, so that there will remain for generations to come a difficulty, no doubt in time a decreasing one, in finding differentiating characters between the species which will hold good in every instance; nor must we even be surprised if we find individual members of one species (when circumstances, such as rearing from one batch of ova, leave no room for doubt as to their identity) occasionally exhibiting one or more of the very characters which we are accustomed to regard as distinctive of another species, the whole genus being still in a condition of flux sufficient to lead to frequent instances of atavism. It is not then with any expectation of finding unerring rules by which it can be decided in all cases: "this is *parthenie*; that is *athalia*; this *deione*," and so forth, that I venture to publish the results of my studies in this group—studies extending over many years in the field and amongst collections, and over months among books—for I believe this to be in the nature of things impossible; all that I can hope for is to show by what distinguishing marks the various species may, *as a rule*, be recognized, and by adducing as large a number of these as I can find for each species, to make it more unlikely that *all* will be found, even in the most aberrant examples of another species than that to which they normally belong. Incidentally I hope to rouse an interest in the great biological question involved, in some collectors whose attention has not been attracted previously in that direction.

To make our enquiry as exhaustive as may be, it seems necessary to go back to the original descriptions and to trace the way in which the various species have gradually been recognized as distinct. Linnæus, in the tenth edition of his 'Systema Naturæ,' published in 1758, includes all the Melitæid forms known to him, with the exception of *maturna* in his description of *cinxia*, which reads as follows: "Papilio alis dentatis fulvis, nigro variegatis, subtus fasciis tribus flavis." Four years later Geoffroy, in his 'Histoire abrégée des Insectes qui se trouvent aux environs de Paris,' 1762, first separated them into "varieties," which he thus characterizes:—

1. "Papilio alis dentatis fulvis, nigro maculatis, subtus fasciis tribus flavis."
2. The same, except "*nigro reticulatis*" instead of *maculatis*.
3. The same, except "*nigro reticulatis et punctatis*."
4. "Papilio alis dentatis fulvis, nigro reticulatis et punctatis, *utrinque* fasciis tribus flavis."

The next step was taken by Rottemburg ('Naturforscher,' vol. vi. p. 5, 1775), who named these "varieties," and recognized them as distinct species, and from him we get the names *athalia* as applied to the second, and *aurinia* as applied to the fourth. The first and third he calls respectively *cinxia* and *pilosellæ*. For

the first he refers to an illustration in Rösels, vol. iv. plate xiii., figs. 6 and 7, which does not however represent what we understand by *cinxia*, but *didyma*. It is certainly a very dull *didyma*, but all doubt as to its identity is set at rest by the fact that Rösels also illustrates the larva (natural size and enlarged) and the pupa, the former of which, at any rate, is unmistakably *didyma*. On the same plate he also illustrates the larva and pupa of *aurinia*, but a reference to the text shows that the butterfly represented was produced by the upper larva, certainly *didyma*. Rösels, however, was not incapable of making a mistake in such a matter, as we shall see. He was a keen and enthusiastic naturalist (and I should judge a delightful personality), but not in any sense a systematist, and he makes no attempt to name the insects he has figured. At the time when he published plate xiii. and its accompanying text, the butterfly had not yet emerged from his second pupa, but he could not wait for its emergence to illustrate the earlier stages; and, besides, it might never emerge at all! However, it did, and he illustrated it on plate xviii. and it turned out to be *cinxia* in our sense of the name, *i. e.*, the *pilosellæ* of Rottemburg! Later on he obtained some genuine *cinxia* larvæ, which he illustrates on plate xxix. These, to his surprise, produced butterflies identical with that illustrated on plate xviii. One can only suppose that he had failed to notice the red head and legs of the caterpillar which he has so painted as to make it look like *aurinia*, though this seems unlikely, as he draws attention to the difference. This serves to illustrate the difficulties to be encountered in tracing the history of these names, but as we are now only considering the *athalia* group, we are not at all concerned with Rösels, fascinating as he is, and only with Rottemburg in so far as he was the first to give a specific name to any member of this group, and this being *athalia*, we must regard the other species as having (for the most part, at any rate) been gradually separated off from it. The original description might include any of the group, even *dictynna*, when we come to the form of the Pyrenees, and probably *aurelia* is the species which most completely answers to the expression "reticulata"; but Geoffroy's book was on the insects taken in the neighbourhood of Paris, where *aurelia** does not occur, so that he no doubt refers to the

* Mr. Wheeler is apparently incorrect in stating that *aurelia*, Nickerl, does not occur near Paris. For in a MS. list, kindly lent me by Mr. W. G. Sheldon for my researches in the distribution of French Rhopalocera, Mr. Henry Brown states that this butterfly occurs in the Department of Seine-et-Oise at Lardy, and Seine-et-Marne at Fontainebleau. The late M. Th. Goossens, in his "Iconographie des Chenilles" (Ann. Assoc. des Naturalistes de Levallois-Perret, 1900, p. 9) also gives Lardy as a locality for the species. But it would be useful to compare the northern French specimens with examples from the Alps before pronouncing authoritatively whether they are identical with the *aurelia*, Nickerl, we know in Switzerland, and in other Central European habitats.—H. R.-B.

insect which we still—rightly—call by Rottemburg's name, *athalia*.

The next species to be separated off was *parthenie*, by Borkhausen, in 1789. He perceived the nearness of this species to *athalia*, though he actually separated it off from *trivia* (a member of the *cinxia* group), under which name he had received it from Vienna. The original description of Borkhausen reads as follows:—"Papilio alis subdentatis fulvis, nigro fasciatim maculatis; anticis ad marginem superiorem nigro annulatis, posticis prope apicem lunatis; subtus fasciis tribus flavescentibus nigro inductis, media divisa." (He also gives it in German.) He remarks that he bred a specimen from a caterpillar found near Darmstadt, and afterwards found more specimens of the butterfly. The size of these presents great difficulties. He states that some were no larger than *argus*, and the largest—all females—only as large as *lucina*. He found them late in the autumn, so, obviously, they were a second brood; and though the second brood in Switzerland barely differs at all in size from the first, it does not follow that this would be the case so much further north.* His account of his specimens certainly tallies with ordinary *parthenie* in other respects. Borkhausen remarks that he gave his caterpillar (which he very inadequately describes) no food, which might account for the size of his bred specimen, but hardly for that of his captured examples. *Parthenie* is illustrated by Godart (1823), much in accordance with the original description; it is *very* small. Indeed both description and illustration seem to refer rather to *varia* in size, which, however, can hardly have been taken near Darmstadt. There is an excellent illustration in Herrich-Schäffer (1843), to the palpi of which Rühl objects, though they are only very slightly too dark in either of the copies with which I am acquainted. To this illustration Keferstein refers in the Stettin 'Entomologische Zeitung,' 1851, p. 244 (not p. 224 as given by Rühl), in giving a description of *parthenoides* as he calls it, the name being thus synonymous with Borkhausen's *parthenie*. The figure of "*athalia minor*" given by Esper, pl. 89, fig. 2 (1829), and referred by Rühl to *parthene* but by Staudinger to *aurelia*, is pretty bad, but less unlike *varia*, I think, than any other. Hübner's *athalia minor*, pl. iv. figs. 19 and 20 (1805), is indubitably *aurelia*.

Dictynna was first described by Esper in the first volume of his 'European Butterflies,' p. 382, in 1777, as follows:—"Alis dentatis fuscis, fulvo maculatis, subtus fasciis tribus albis, media bis dissecta." He also gives (pl. xlviii. fig. 2, *a* and *b*) figures both of the male and female. The upper side of the male is fairly good; on the under side the black lines of the fore wing are much too straight, and the other markings unrecognizable,

* It is significant that when *athalia* occasionally produces a partial second brood the specimens are extremely small.

the hind wing is tolerably good, but the black spots in the dark band are much too near the top of the lunules. The female, though it could not represent any other species, is distinctly bad. It is unfortunate that the description "*media bis dissecta*" must have been taken from an unusually light specimen, in which what is really the upper division of the outer dark band was so lightly coloured as to appear to belong to the central light band, giving it the appearance of being divided into three parts transversely. Out of hundreds of specimens which I have examined, there are certainly not a dozen in which this is the case. Bergstrasser depicts it under the name *maturna* in 1779, in his 'Nomenclatur,' vol. iii. p. 78, and makes objections to the original description of *maturna* on the ground of the absence of red! (which is presumably what is meant by "*purpurascens*"); real *maturna* he figures on pl. 75 under the name *agroptera*, and as a form of *cynthia* on pl. 80; indeed, I find it very difficult to take Bergstrasser seriously, in spite of the reverence with which some modern entomologists appear to regard him. The names, by the way, can only be found by reference to the text; they are not given on the plates. Hübner's *corythalia* apparently also represents *dictynna*; it is illustrated in vol. i. pl. 3, figs. 15 and 16, and the under side is passably good. Hübner's "*dictynna*," pl. 14, fig. 10, is called by him "*Brenthis dictynna*," and represents *ino*. Esper, in giving his original description, speaks of *dictynna* as having been up to that time included with other species in *cinzia*. He expresses some doubt whether Geoffroy's fourth variety, named *aurinia* by Rottemburg, may not have represented this insect, but decides, undoubtedly rightly, against it. The name *dictynna* had, as he says, been given by Schiffermüller in his 'Verzeichniss,' p. 179 (1776), to some *Melitæid* form, but without any description, and he adopts it for the insect that he figures and describes. There has never since been any question (except apparently in the mind of Bergstrasser, who in his other book seems to have regarded it as a variety of *athalia*) as to its specific value.

Deione is first mentioned by Hubner at the foot of an excellent illustration in 1805, figs. 947-950, but the unfinished letterpress does not arrive at a description of it. The first description, with another good illustration, is by Duponchel in 1832, in his 'Papillons de France.' This is what he says about it: "Cette *Melitée* fait le passage de la *Phœbé* à l'*Athalie*. En dessus elle offre le même dessin que celle-ci, avec cette différence que la bande du milieu et les lunules terminales des quatre ailes sont d'un fauve plus clair que le fond. En dessous elle ne diffère de la première que parceque les lignes noires qui cernent les taches et les bandes des ailes inférieures sont plus fines, en même temps que le fond de ces mêmes ailes est d'un jaune plus pâle et que les nervures en sont noires, tandis qu'elles sont

jaunes dans la *Phœbé*”* (Dup. ‘Papillons de France,’ p. 276). Herrich-Schäffer, judging from Hubner’s illustration, considered it a variety of *parthenie*, a much more possible suggestion than Staudinger’s connection of it with *athalia*. The under side at once separates it from both, and connects it, as Duponchel says, with the *cinxia* group, and both larva and pupa are abundantly different from either, a fact which settles its specific value, a matter to which we shall have to refer later; the Spanish specimens and the Swiss form, the misnamed *berisalensis*, have greatly added to the difficulties connected with this species.

DRAGONFLIES FOR THE CABINET.

By W. J. LUCAS, B.A., F.E.S.

By the beginning of June the dragonfly season has commenced in earnest, and it may be that some entomologists who would like to collect and study the Odonata are deterred by the idea that they cannot keep specimens of these insects in as unchanged a condition as they can those of beetles or Lepidoptera. Nor is this wish to secure a presentable set of specimens of necessity a sign of the “mere collector,” for every naturalist who desires that his statements may bear the stamp of accuracy must possess a sufficiency of good specimens for continual reference and comparison.

To a certain extent this widespread idea, that the colours of dragonflies are evanescent, is correct, the colouring matter being situated in a part of the insect quite different from that in which the colours of Lepidoptera reside. But this evanescence is not by any means so general as is usually supposed, when a few simple precautions have been taken. There are, in fact, many dragonflies in which the colours remain practically as fine as they were when the insects were alive.

It will be found too that in some individuals the colours remain after death much more true than in others of the same species, and in cases where the insect is a common one, a selection will enable the one interested to gradually obtain a good series. This as a matter of fact is practically all that can be done in the case of the very small species which are too delicate to be eviscerated.

* This *Melitæa* forms a transition between *phœbe* and *athalia*. On the upper side it shows the same design as the latter, with this difference that the central band and the terminal lunules of the four wings are of a lighter fulvous than the ground colour. On the under side it only differs from the former in that the black lines which bound the spots and bands of the lower wings are finer, and also that the ground colour of these wings is of a paler yellow, and the nervures black, while they are yellow in *phœbe*.

What had best be done in the case of all the larger species—large enough, that is, for easy manipulation—is to eviscerate them and then dry the shell, having stuffed it with cotton-wool, or not, according to the fancy of the operator. The insect should first be fastened down on its back on a sheet of cork, with very fine pins at the thorax and last abdominal segment near the appendages. Then with a pair of sharp-pointed scissors a slit must be made from the second (third in the male) segment to the eighth, thus leaving intact those bearing the genitalia. Now with a pair of fine-pointed forceps the contents of thorax and abdomen must be carefully removed. Usually most of this comes away at once, at any rate from the thorax. If not, while the rest is being removed, great care must be exercised lest the inner surface of the shell should be damaged, for on this in many cases is to be found the pigment to which the colouring is due. This is all. The abdomen may now be filled with a *very* little cotton-wool, or it may be dried as it is. The markings will now remain, and the colours to a greater or less extent, sometimes almost perfectly, and, of course, there are other elements of beauty besides colour. At any rate, a cabinet of dragonflies which have been so treated makes as fine a show as a cabinet of butterflies and moths.

If the preservation of colour is sought for scientific purposes only, the dragonflies should be put in good spirit, where their colour usually keeps excellently, except perhaps that of the blue-powdered species such as *Libellula depressa*. Indeed, it has been suggested that the small species which cannot be eviscerated should be put in spirit for some time, and then be relaxed and set. It is doubtful, however, if this is so successful a method as was supposed, and specimens dried in spirit are often very difficult to relax, especially if they are not thoroughly mature.

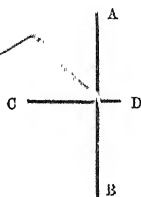
Just as with Lepidoptera, dragonflies that have not been eviscerated are liable to grease, with the same dire effect upon their colours, and this grease it does not seem so easy to remove with solvents such as benzine, or at any rate its effects are more permanent. Mould, mites, moths, and beetles must be guarded against by the use of naphthaline and by the other ordinary methods.

Usually the colours of the following British species keep excellently, often even without eviscerating:—males of *L. depressa*, *L. fulva*, *Orthetrum cancellatum*, and *O. cærulescens*; both sexes of *Cordulia ænea*, *Somatochlora metallica*, *S. arctica*, *Oxygastra curtisii*, *Cordulegaster annulatus*, *Gomphus vulgatissimus*; many examples of *Æschna mixta*, *Æ. juncea*, *Æ. cyanea*, *Æ. grandis*, and *Æ. isosceles*. But individuals in this last genus vary in this respect, and those seem to keep much better which are caught late in the season. The two beautiful species

Calopteryx virgo and *C. splendens* retain their colours excellently—and luckily, for they could scarcely be eviscerated. The same may be said of *Lestes sponsa* and *L. dryas*, and to a great extent of *Pyrrhosoma nymphula* and *P. tenellum*. One important point to notice is that as time goes by the specimens in the cabinet tend to regain their colours rather than the reverse. There is little doubt that dragonflies keep their colours better if they have had no food for some time before being killed.

Setting is an important matter in the case of dragonflies, for there are the legs and abdomen to attend to as well as the wings. After having been killed in the cyanide-bottle, they should be pinned through the thorax, care being taken that the pin does not bring away a leg when it comes through the under surface. For uniformity's sake the costal margin of the two hind wings had better form one straight line at right angles to the main axis of the insect, and the hind margin of the fore wings should just not meet the hind wings. In the Anisopterids the anal angle of the hind wings should be supported while drying. Flat setting-boards *must* be used. Also there must be a groove wide enough to allow of the legs being properly arranged, and deep enough to keep all parts of the set insect from the paper in the cabinet-drawer. In life all six legs are turned forward, but most collectors, not only for appearance sake but also for facility of observation, will not arrange them so. Usually the fore legs will be put forward, the hind ones backwards, and the mid ones more or less at right angles to the thorax. Perhaps the legs look better, and they certainly take up less room, if they are bent at the joints—not stretched out straight. While drying, legs and abdomen must be kept in position with pins and braces; and the head, if not controlled, will usually tend to look over one shoulder or the other in a very idiotic fashion. Labelling must be done carefully, as the ticket shows when placed beneath the insect. The drying process is rather slow, two or three weeks at least being required for the larger species.

When obtainable empty nymph-skins should accompany the perfect insects. These are very ethereal and will seldom bear a pin; a good method of mounting them is near the end of a very thin strip of card, c d, at right angles to the length of the nymph-skin, a b. The whole is secured in the cabinet-drawer by a pin passing through the card at c, the pin also bearing the label. It is quite easy to gum the skin at d without hiding any important structures.



PYRAMEIS CARDUI AND THE JUNE RAINFALL OF 1906.

By ROBERT ADKIN, F.E.S.

THE influence of meteorological conditions upon our alien lepidopterous fauna is a subject of deep interest, but it is an exceedingly complex question, and so beset with side issues, each capable of exerting an influence for good or evil, that one is in the majority of instances reluctant to assign cause to effect. Occasionally, however, some special circumstance appears to stand out so clearly that whatever possible explanations might be given, we may, with some measure of certainty, fix upon it as a well-defined cause for some particular phenomenon. The failure of the multitudes of *Pyrameis cardui* that appeared on our southern and south-western coasts in the spring of 1906 to produce a corresponding abundance of the species in autumn appears to be a case in point, the assumption being that the exceptional weather conditions prevailing at a critical time in the species development was the cause of the failure.

The available records show that the species was met with sparingly in many places near the south-east and south-west coasts during the last week in May. There can be little doubt that the individuals then seen were the early arrivals of a great immigration which struck the Kent and Sussex and the Cornish and Devon coasts on June 2nd and 3rd and spread inland, distributing themselves over the southern portions of the country; those arriving on the Cornish and Devon coasts apparently taking a north-easterly course along the Bristol Channel and were traceable as far as the southern parts of Monmouthshire, while those which reached the Kentish and Sussex coasts appear to have spread themselves out over the south-eastern counties and the London district.

The weather over the southern portions of England during the greater part of the month of June was fine and suitable for the butterflies' egg-laying, the range of temperature being fairly high, with a full amount of sunshine and small rainfall. But on the night of the 28th practically the whole of England south of a line drawn from the Bristol Channel to the Wash was visited by a cyclonic rain of exceptional violence, an area of approximately twenty-two thousand square miles receiving from one to two inches of rain, while within this a roughly triangular patch having its apex near Wisbeach (Cambs) and its base extending from near Croydon (Surrey) to Wallingford (Berks), an area of some two thousand six hundred square miles, received from two to upwards of two and a half inches of rain, practically the whole of which fell within twelve consecutive hours. To put the matter briefly: the southern half of England received in the space of a single night an amount of rain equal to that

which falls on an average throughout the whole month of June. The fall was accompanied by an easterly or north-easterly wind, and the reduction in temperature was scarcely less remarkable than the heavy rainfall.

It is practically certain that the butterflies which were observed on the coasts at the end of May and during the first two or three days of June, would have deposited their eggs as they passed inland, and that the heavy rainfall came just at the most critical time in the insects' existence, namely, when the young larvæ were just leaving or had just left the eggs, and when they would be least able to withstand its severity; the inference being that a very large proportion of them were overcome by the phenomenal rainfall and perished.

A NEW SUBGENUS OF AFRICAN BEES.

By T. D. A. COCKERELL.

THE leaf-cutting bees, forming the genus *Megachile*, exist in practically every part of the world where there is vegetation, with the exception of New Zealand. More than seven hundred species have been described, and new ones are added every few months. This enormous group, as might be expected, is far from uniform, and various attempts have been made to divide it up. The segregates *Chalicodoma* and *Gronoceras*, distinguished both by their structure and their nest-building habits, seem to me to be very good genera. Others, especially some of the genera proposed by Robertson, are not so satisfactory, and it is not yet clear how many should be given full generic standing. It seems both justifiable and desirable, however, to distinguish the more striking groups as subgenera, leaving it for the future to decide how many of these deserve the rank of genera.

Creightonella, n. subg.

♂. Mandibles with the usual large tooth beneath; antennæ slender, normal; anterior coxæ spineless or with an indistinct rudiment; anterior tarsi rather thick but normal; claws deeply bifid; sixth abdominal segment produced, quadrate, keeled down the middle, with the projecting edge six-spined; seventh segment with a large thorn-like projection, the sides of which have three sharp edges, two lateral and one (on which are two little tubercles) posterior; hind margin of fourth ventral segment with a broad shallow emargination, on each side of which is a strong spine, directed posteriorly; in the interval between these spines, and a little posterior to them, are seen two other spines, slender and clear ferruginous in colour. Type, *M. mitimia*, n. sp.

Megachile mitimia, n. sp.

♂. Length about 15 mm.; black, rough with very dense minute punctures; legs entirely black, except that the claw joint is obscurely

reddish, and the claws have the basal half red; hind margins of abdominal segments, and the teeth on sixth segment, red; mandibles bidentate, the inner tooth rounded; clypeus not at all keeled, the punctures larger in the middle than at the sides, the anterior margin a little produced and truncate in the middle; hair of head and thorax dull white, not abundant, on posterior part of pleura it is reddish; tegulae ferruginous, fuscous basally; wings yellowish hyaline, apical margin a little darkened, nervures ferruginous; the scanty hair of legs mainly black or fuscous, but the tarsi fringed with bright fox-red hair; first two abdominal segments with much bright fox-red hair; hind margin of fifth segment and upper surface of sixth, rather thinly clothed with red hair; first two ventral segments with scattered reddish hair.

Hab.—Ekuiva Valley, W. Africa, at flowers of a native species of mint, collected (1907) by Dr. F. Creighton Wellman. The specific name means black and red in the language of the Sula Islands.

Another species of *Creightonella*, differing by the colour of the hair on the tarsi and ventral abdominal segments, &c., has been described by Friese (Zeits. f. Hym. Dipt. 1903, p. 273) as *M. sexdentata*. Unfortunately this name was used by Robertson in 1895 for an American species, so it will have to be changed. *M. mandibulata*, Smith, is also perhaps a *Creightonella*, but this cannot be definitely determined without an examination of the types.

It may be as well to record here that Dr. Wellman also took *Megachile ianthoptera*, Smith, in the Ekuiva Valley.

BIBLIOGRAPHICAL AND NOMENCLATORIAL NOTES ON THE RHYNCHOTA.

By W. L. DISTANT.

Mr. KIRKALDY's last disputation on names and words (*ante*, p. 123) has quite bewildered me. He writes: "In using *Leptocoris* I have simply selected the name which is proper under the rules followed by every living hemipterist but Mr. Distant." As Dr. Bergroth is still living (and we all hope will live for many years to come), that statement seems inaccurate. If he is not living, as I absolutely disbelieve and have proof in a recent letter to the contrary, what is the meaning of the sentence: "It is because Bergroth is so strict an observer of the law that I feel sure he would now use *Leptocoris*"? Dallas's work may be "nearly sixty years old," but if Mr. Kirkaldy had referred to it and studied the genus rather than the name which represents it, he might have avoided redescribing the form *Serinetha taprobanensis*, Dall., as *Leptocoris bahram*, Kirk. However, we all make mistakes.

In proposing new names for preoccupied generic ones, Mr. Kirkaldy seems to be unfamiliar with his subject. Thus he proposes the name *Bæria* for *Panda*. It is quite true that in 1898 I used the preoccupied name *Panda*. But it is equally well known to most serious students that in 1899 the late Dr. C. Berg substituted for it the name *Tripanda*. Mr. Kirkaldy's *Bæria* is thus an unnecessary synonym. As he writes that he has a "Catalogue of the Hemiptera now in the press," it may perhaps be too late for him to accept an anticipatory correction, but the following is the synonymy:—

Genus TRIPANDA.

Panda, Dist. Ann. Mag. Nat. Hist. (vii). ii. p. 299 (1898)
nom. præocc.

Tripanda, Berg, Comun. Mus. Buenos Aires, i. p. 78 (1899),
nom. n.

Bæria, Kirk. 'Entomologist,' 1908, p. 124.

NOTES ON BRITISH BRACONIDÆ.—VI.

By CLAUDE MORLEY, F.E.S., &c.

(Concluded from p. 129.)

7. *pallidipes*.—This species has occurred to me on bushes in woods at Wherstead and Assington in the middle of July, and at Monks Soham, on a willow-leaf, in the middle of August, in Suffolk; Shere (Capron) and Greenings (W. Saunders), in Surrey; bred during the same year from a larva of some microlepidopteron collected on oak at Yarmouth, Isle of Wight, on June 10th, 1905 (Bankes). The cocoon is not described. It is cylindrical, white, quite transparent, $5\frac{1}{2}$ mm. long, and apparently pendent. Miss Chawner has given it me from the New Forest, together with the female, which had entirely removed one end in emerging.

8. *ictericus*.—This abundant species has never occurred to me in Suffolk, though I have found it in June at Carisbrooke, Isle of Wight; and possess many captured by Piffard at Felden, in Herts, and W. Saunders at Greenings and Reigate, in Surrey, from June to August.

9. *confinis*.—As I understand it, this differs very little from the last species. My four females were taken by Beaumont at Kilmore, in Ireland, in August, and Capron at Shere.

11. *obfuscatus*.—There is little to add to the summary of what is known of this species' economy given in Trans. Ent. Soc. 1907, p. 38. Since writing it I have taken many females walking over a large *Boletus*, doubtless tenanted by *Orchesia micans*, and

tapping it assiduously with their antennæ at Hulver Bridge, in Suffolk.

12. *punctiventris*.—Apparently uncommon. Bignell has given it me from Devon, and I have found it on reeds at Southwold late in September, and at Tuddenham Fen on June 12th.

13. *atrator*.—One female of this very distinct species was running on my bedroom window here at 6 p.m. on August 31st, 1907. It is said to prey on moths, and not *Cis boleti*.

15. *abdominator*.—A male was swept by me at Queens' Bower, Brockenhurst, in August, 1901. I also have a couple of females taken at Felden, in Herts, by Piffard, and at Golspie, in Scotland, on August 26th, 1900.

17. *melanostictus*.—Not hitherto bred. On May 29th, 1899, Haggart sent me its cocoon, which is nearly 6 mm. in length, elongate-ovate, somewhat shining, transparent, pale piceous, with darker reticulating strands, and exactly identical with that of *M. versicolor*, from Galashiels; he said it had emerged from the pupa of *Thera variata*. A female had emerged on 11th of the following month between midnight and 10 a.m., and had entirely removed the smaller end of the cocoon, which does not appear to be pendent.

18. *pulchricornis*.—This common species occurred to me in the Bentley Woods in 1894, and at Brockenhurst in May, 1895; Beaumont has taken it at Oxshott in July, and Harting in August. On May 23rd, 1900, a female emerged from its cocoon, which is smaller, paler, and much narrower than that of the last species, and has a "swing-rope" of 13 mm. This was sent me from Reigate by Prideaux on 11th inst., with the dead and shrivelled host—a larva of "what I could, with fair certainty, identify as *Agrotis agathina*, found on heather a week ago, and which developed the enclosed solitary cocoon. The larval host lived some days after its extrusion, apparently in great discomfort—incessantly writhing—but no further parasites were disclosed" (R. M. P. *in lit.*). When it came to me the host-larva was no longer than the Braconid's cocoon. Chapman also bred a female at Locarno or Cannes in April, 1900; and Miss Chawner has given me both sexes, bred in July at Burley, in the New Forest, from "hazel-leaves."

20. *scutellator*.—Both sexes given me by Piffard from Felden, in Herts, and by Beaumont from Kilmore, in Ireland, in August. I took a female on my study-window here in the middle of last August.

21. *unicolor*.—I have one male, probably referable to this species, from the New Forest.

23. *versicolor*.—On May 29th, 1899, Haggart sent me a cocoon and the larva-host, whence it had emerged, found on heather at Galashiels on 27th. This larva I sent to Barrett for determination, and he pronounced it, on June 5th, to be that of some

Tenthredinid. A female of the present species —var. *bimaculatus*, Wesm.—emerged between midnight and 10.30 a.m. on June 10th. A second female of the same variety emerged on Oct. 11th, 1899, from its cocoon. The latter had emerged from the body of a larva of *Bombyx rubi* when I received it on 21st of the preceding month from Rev. C. D. Ash, who took it at Selby, in Yorks. In both these cases the cocoon had no “swing-rope,” but were, as in Wesmael’s case, in confined quarters, which may, as suggested by Marshall, have accounted for the omission.

25. *filator*.—Tostock, in Suffolk, in late September (Tuck); Shere (Capron); New Forest (Miss Chawner). I have only met with females in quite late autumn, by beating *Picea excelsa* at the end of October, and once (November 2nd, 1902) I took two from quite inside a dead rabbit. It is said to affect fungi, which is known to often attract carrion beetles. In June, 1907, I swept a very large male of this species at Matley Bog, in the New Forest.

26. *cinctellus*.—Three ferruginous males in my collection can, I think, be nothing but this species or *M. decoloratus*, of which a unique German female is alone known; they were taken by Thornley at Scotton Common, in Lincolnshire; bred by Miss Chawner in the New Forest, from a cocoon like, but smaller than, that of *M. versicolor*; and swept by myself from rough grass in Wicken Fen, June 11th, 1902. They are, however, very untypical.

27. *tenellus*.—I swept a single female of this distinct species at Shalfleet, in the Isle of Wight, at the end of last June.

28. *rubens*.—Piffard has given me specimens of both sexes from the coast sandhills at Felixstowe, in Suffolk, and Beaumont took a male in a similar situation at Kilmore, in Ireland, in August, 1898. It is a gregarious parasite of *Agrotis vestigialis*, &c.

29. *laviventris*.—Females of this small species have been bred by Miss Chawner in the New Forest. The cocoon is cylindrical, dirty white, much more woolly at the anal half, and only $3\frac{1}{2}$ mm. in length.

30. *fragilis*.—This species, as I understand it, almost exactly resembles *M. punctiventris*, but with no tracheal grooves on the post-petiole. It is not uncommon. I have found it at Tuddenham Fen, Halesworth, Needham, Ipswich, and Moulton, in Suffolk, from May 15th to September 26th; and W. Saunders also took it at Greenings, in Surrey.

I shall at all times be most grateful for bred hymenopterous parasites, which I fear lepidopterists do not by any means value at their true scientific worth; this is quite as great as that of the hosts whence they emerge.

Monks Soham House, Suffolk: March 25th, 1908.

ON TWO NEW GENERA OF CHALCIDIDÆ FROM BORNEO.

By P. CAMERON.

ELEMBA, gen. nov.

Pronotum quadrate, of equal width, narrower than the mesonotum, wider than long. Mesonotum without parapsidal furrows, the mesosternum bordered by a distinct lateral furrow. Scutellum large, longer than wide, its sides bordered by a distinct crenulated furrow; it is not narrowed at the base; its apex rounded, only slightly narrowed, and with an oblique rounded slope. Head as wide as the thorax; the temples distinct, roundly narrowed. Head longer than wide; the malar space not quite half the length of the eyes, and with a narrow but distinct furrow above. There are two longish deep foveæ on the lower part of the face in the centre. Mandibles large, broad, short, furrowed in the middle at the apex, probably bidentate. Antennæ apparently twelve-jointed; the apical joint flattened, longer than the preceding; the front is excavated to receive the scape, and has a stout keel on its lower part. Abdomen distinctly narrower than the thorax, flat above, the basal two segments incised at the apex, of nearly equal length; the sheaths of the ovipositor broad, covered with stiff hairs, half the length of the abdomen. Legs moderate, the femora not dilated to any extent; the middle calcaria long, stout, the posterior short, slender. Marginal branch in fore wing elongate, gradually narrowed to near the apex of the wing; stigmal branch moderately long, curved, almost bifid at the apex. The antennæ are slender, the flagellum is of equal width, the first joint of the flagellum is more than twice longer than wide, twice the length of the following, which is shorter than the next. The basal joints of the flagellum are covered with short, stiff, black hair. On the apex of the mesopleuræ, above the middle coxæ, is a triangular space bounded by deep furrows. Tegulæ large, conchiform. Abdomen (not counting the ovipositor) is long, narrow, narrowed towards the apex, the sides not keeled. Eyes bare. Labrum hidden. The first abdominal segment is much longer than the others. The metanotum is not keeled; the centre is bounded by two furrows. The head is not narrowed in front.

This genus comes close to *Epistenia*, which may be known from it by the presence of parapsidal furrows, and by the basal abdominal segments being transverse, not incised.

Elemba levicollis, sp. nov.

Head and thorax dark blue, the apex of mesopleuræ and the metanotum green, abdomen dark purple above, the sides blue, the apices of the apical segments more or less coppery; antennæ black; legs black, the fore legs tinged with violaceous, the fore coxæ dark blue, the four hinder green, thickly covered with short white pubescence. Wings hyaline, broadly, slightly tinged with fuscous at the apex; the nervures black. ♀. Length, 11 mm.; ovipositor, 4 mm.

Kuching, October (John Hewitt).

Face strongly, deeply punctured, the part in the centre below between the furrows finely, closely punctured; the lower part of the sides of the front is smooth, with two or three large punctures in the centre; the upper is closely, transversely punctured; the central depression smooth, its upper part coppery tinted; the ocellar region is sparsely, weakly punctured and coppery tinted, the rest of the vertex is more strongly punctured. Upper orbits above weakly, below strongly punctured. Prothorax smooth. Mesonotum covered strongly with round deep punctures, the edges of the punctures sharply raised; down its centre is a dark violaceous band which becomes narrowed towards the apex. The punctuation on the scutellum is closer and runs into longitudinal striæ, the apex is closely, transversely striated. Metanotum in the narrowed centre with some striæ, the dilated sides depressed, smooth. Mesopleuræ strongly punctured above, more weakly below; the furrow at the base is widened and curves obliquely downwards; this down branch is wider than the longitudinal one and is smooth; on the apex the punctuation is finer and closer, and runs into striæ, this posterior part being separated from the rest by a shallow furrow. Back of abdomen smooth, the sides finely aciculated.

Pentachalcis, gen. nov.

Hind femora with three large and two small teeth. Middle tibiæ without spurs. Antennæ (including the ring-joint) twelve-jointed. Apex of scutellum with a distinct bluntly rounded projection, of which the sides and apex are clearly raised above the basal part. Metanotum untoothed, but with a small rounded projection on the lower part of the sides. Malar space long, nearly as long as the eyes. Abdomen sessile, not truncated at the base. Hind coxæ almost as long as the femora, which are longish oval; the penultimate joint of the hind tarsi is as long as the preceding two united, and is thicker than them; the femora extend beyond the apex of the abdomen. The antennæ are placed distinctly above the lower part of the eyes; the scape extends above the vertex. Marginal and post-marginal veins long, the latter much thickened; the stigmal branch short, thick.

Comes near to *Pseudochalcis*, Kirby. *Pentachrysis* is the sole described genus in the group with only five teeth on hind femora.

Pentachalcis erythronota, sp. nov.

Black; the mesonotum and scutellum bright red; the four anterior knees, the base and apex of the four front tibiæ, and all the tarsi of a duller, more testaceous red. Hind femora with three longish, clearly separated teeth on the base, and two short stumpy ones on the apex, the apical of which is broader than the penultimate. Wings almost hyaline, the apex broadly fuscous violaceous; the nervures black. Basal three antennal joints bare, shining; the others opaque, thicker, covered with a microscopic down, the fourth slightly but distinctly longer than the fifth. Face strongly, deeply punctured, more or less reticulated; in the centre of the face is a longitudinal keel, equally distant from the top and bottom; the vertex and sides of the front are similarly punctured-reticulated, as is also

the occiput. The outer edge of the outer orbits and the lower edge of the malar space are stoutly keeled, the latter being transverse. Pro-, mesonotum, and scutellum punctured-reticulated closely, but not quite so strongly as the face. Apex of scutellum ending in a projection, wider than long, depressed, its sides and apex stoutly keeled, the sides oblique, the apex transverse. Metanotum coarsely reticulated; the sides below end in a short rounded tooth. Pleuræ coarsely punctured, the mesopleuræ with a wide, smooth, oblique depression commencing below the tegulæ; its upper part is smooth; the base with a row of foveæ, the apex with a broken keel; the lower part is stoutly striated, the striæ being clearly separated. Abdomen smooth, the apical three segments strongly punctured at the base. The tibiæ and tarsi are thickly covered with a stiff white pubescence. ♂. Length, 6 mm.

Kuching (John Hewitt).

The ocelli prominent, in a curve. Mesonotum trilobate. The hind wings are faintly clouded at the apex.

NOTES AND OBSERVATIONS.

CADDIS-FLY EATING APHIDES.—Mr. Arkle would confer a favour on entomologists if he would secure a specimen of the caddis-fly that eats aphides (*antea*, p. 92), get it named, and describe the mouth-parts by which it performs this feat. — T. A. CHAPMAN; Betula, Reigate.

ABERRATION OF AMPHIDASYS BETULARIA.—Referring to Mr. Mansbridge's remark (*antea*, p. 112) that in the buff form of *A. betularia* obtained by the Middleton collectors the ground-colour of the wings is white, I may state that I have eight of those specimens, and that in no case is the ground-colour white but ochreous, like the variety he describes. — A. B. FARN; Breinton Lodge, Hereford, May 16th, 1908.

THE LONG LIFE OF SCOLIOPTERYX LIBATRIX.—On May 1st I took a specimen of *Scoliopteryx libatrix* at rest. It was in excellent condition, as, owing to its torpid habits, seems to be usual with this species whenever captured. But the date leads me to inquire if some of your correspondents will give the latest dates on which they have taken *libatrix*, in order to estimate the average length of life of the imago. My only note of breeding the insect is the emergence on August 9th, 1886, of a specimen from a pupa found by chance in collecting other things. This, however, suggests the possibility of ten months' hybernation in the perfect state for this species.—FRANK E. LOWE; St. Stephen's Vicarage, Guernsey.

FOOD OF GLOW-WORM.—On May 4th not far from Oxshott Station I picked up a specimen of the mollusk *Helix cantiana*, and on examining it noticed a glow-worm without wings (probably a larva)

inside the shell. To make certain that the insect was preying on the mollusk, I broke away carefully the large whorls of the shell in pieces till I found the remains of the snail towards the apex of the shell. I had always understood, though I had no definite knowledge, that snails were the food of the glow-worm, and was therefore pleased to catch one at its meal.—W. J. LUCAS; 28, Knight's Park, Kingston-on-Thames, May 10th, 1908.

LIFE-HISTORY OF *HESPERIA PANISCUS* (PALEMON).—I think Mr. Rollason's account of the life-history of *H. paniscus* (*antea*, p. 102) calls for some correction, as he claims to have given a much more complete life-history than those published by Messrs. Buckler, Hellins, and myself; whereas Mr. Rollason's history of the species is *very incomplete*, as he altogether omits the life of the larva during its earlier stages (excepting a very vague description of it after emerging from the egg). He also even does not refer to the number of moults, or anything relating to the larvæ from soon after hatching on June 21st until August 13th, during which period of time they were not examined, although he must have been aware of the fact that they would pass through different stages. He alludes to giving much fuller detailed descriptions of the fully-grown larva, as well as the pupa, and actually states: "I find my description of the larva in *various* stages is of much fuller detail in nearly all respects." These, however, seem to me to be unnecessarily lengthy, and I think the descriptions given by me of *every* stage to be full enough for all practical purposes. I refer to the complete life-history of this species I published in the 'Entomologist,' xxv. 1892, pp. 225, 254 (I may here take the opportunity of correcting a printer's error in line 16 from bottom, p. 226; the word "seventeen" should read "seven"). This was the first complete life-history published of *H. paniscus* (*palemon*), and I believe I am correct in saying it remains so. Certainly Mr. Rollason's history of this species is very incomplete.—F. W. FROHAWK.

ENTOMOLOGICAL SOCIETY OF LONDON—CONVERSAZIONE.—What we believe to be the first reception of its kind by the Entomological Society of London was held in the rooms of the Civil Service Commission—formerly the London University Buildings—on the evening of Friday, May 15th. The somewhat chilly atmosphere of officialism which pervades the great examination schools had, however, been dispelled by the joint efforts of furnisher and exhibitors, and Fellows who only know the great hall, the vestibule, and the western wing generally under its customary aspect were agreeably surprised at the transformation effected. The former was reserved as a refreshment and conversation room, Miss Rosabel Watson's Ladies' Æolian Band performing selections of pleasant music during the evening, especial care being taken that the sounds should not penetrate to the theatre in which the several addresses kindly given by Mr. Donisthorpe, Colonel D. Bruce, C.B., F.R.S. and Professor E. B. Poulton, F.R.S., were to be delivered. The guests who numbered about two hundred and fifty were received by the President, Mr. C. O. Waterhouse, Miss Waterhouse, Prof. Poulton, and one of the Secretaries, and it is only to be regretted that many more had not accepted the

invitation of the Society, it being a matter of some congratulation, however, to those who did, that there was no undue crowding, either at the exhibition stands, or at the tables where the microscopes were installed.

Among the more important exhibitions we noticed the following:—Professor E. B. Poulton, F.R.S., Mimicry in American Papilios. Lt.-Col. N. Manders, R.A.M.C., Series of *Melanitis leda* taken at different seasons. Dr. G. B. Longstaff, Plants of *Bryophyllum calycinum*, a favourite resting-place of *Callidryas eubule*: Rest attitudes of Butterflies; Flies mimicking Wasps; Water-Grasshoppers. Dr. F. A. Dixey and Dr. G. B. Longstaff, Scents in Butterflies. The President, Illustrations of Tsetse and other biting Flies. Mr. E. A. Butler, Dimorphism in Hemiptera, and recent additions to the British List. Mr. R. Shelford, Insects preserved in Amber. Lt.-Col. C. T. Bingham, Nest of Wasp from Assam, with occupant attacking Spider. Mr. H. J. Elwes, F.R.S., Variation and Dimorphism in Indo-Chinese and Indo-Malayan Butterflies. Mr. W. J. Kaye, Heliconine Butterflies from British Guiana. Mr. W. F. Rosenberg, Rare Heterocera from South America. Mr. H. Eltringham, Mimicry in African Butterflies. Mr. O. E. Janson, Goliath Beetles. Dr. H. C. Phillips, Parasites on Lepidoptera. Mr. G. T. Porritt, Melanism in West Yorkshire Lepidoptera. Mr. C. P. Pickett, British Lepidoptera. Mr. L. W. Newman, Living British Larvæ and Pupæ. Mr. A. E. Sich, Lepidoptera of South London. Mr. Selwyn Image, Lepidoptera observed within six miles of Charing Cross. Mr. R. Adkin, Local Variation in a common British species. Mr. A. H. Jones, The Genus *Anthocharis*. Miss M. E. Fountaine, Spring Butterflies of the Mediterranean Region. The Rev. G. Wheeler, Rare and variable species of Swiss Butterflies. Dr. T. A. Chapman, Homœochromatism in French Butterflies. Mr. A. W. Bacot, *Malacosoma neustria* and *M. castrensis*, and their hybrid forms. Mr. L. B. Prout and Mr. A. W. Bacot, Experiments in Mendelian Heredity with *Acidalia virgularia*. Mr. A. Hall and Mr. C. J. Grist, Mimetic Nymphaline Butterflies and their Models. Mr. S. Edwards, Morphos. Mr. J. A. Clark, Varieties of *Peronea cristana*. Mr. R. South, Aberrations of *Peronea cristana* and *P. hastiana*. Mr. H. St. J. Donisthorpe, Insects and other Forms associated with British Ants; The British Ants; Observation Nests of *Formica rufa* and *F. sanguinea*. Mr. A. Harrison and Mr. H. Main, Local Forms and Varieties of *Pieris napi* and *Aplecta nebulosa*. Mr. A. E. Tonge, Stereoscopic Photographs from Nature. Mr. H. J. Turner, Life-Histories of the Genus *Coleophora*. Mr. E. B. Nevinson, British Aculeate Hymenoptera. Mr. H. Main, Photographs of Lepidoptera; and the Obligation Book of the Society, with the signatures of the Duchess of Kent and the Princess Victoria, afterwards Queen Victoria.

A special word of praise is also due to Miss Garnet for her exquisitely minute and faithful water-colour drawings of Coleophorids, exhibited by Mr. Selwyn Image for Mr. Christopher Whall; while the whole of two sides of the room were decorated with the drawings of varieties of British Lepidoptera in the collection of Mr. S. J. Capper by Mr. S. L. Mosley—a unique and instructive series.

The Smaller Room was entirely devoted to microscopic demon-

strations by Fellows, and others including Messrs. R. & J. Beck, Limited; Messrs. Ross, Limited; and Mr. Charles Baker; the demonstrations on the lantern-screen proving especially attractive, while Mr. F. Enoch in the Large Room was also surrounded at his microscopes throughout the evening by appreciative audiences, as well as Col. D. Bruce, F.R.S. who, with Capt. Hamerton, had a table covered with microscopic preparations to illustrate the chief entomological features of the Sleeping Sickness as demonstrated in the theatre.—H. R.-B.

CAPTURES AND FIELD REPORTS.

CAPTURE OF NOTODONTA PHÆBE = TRITOPHUS IN BEDFORD.—On May 13th, 1907, whilst collecting round the electric lights of Bedford, I took a specimen of *Notodonta phæbe* = *tritophus*. From Mr. South's latest book on the 'Moths of the British Isles' there appear to be only six other records of this moth or caterpillar having been taken in England.—W. S. BROCKLEHURST; Bedford, May 8th, 1908.

[I have seen the specimen noted above and find it correctly identified.—R. S.]

LAVERNA DECORELLA AT BLOXWORTH, DORSET.—The record of *Laverna decorella*, Steph., noted in the 'Entomologist,' vol. xxxi. p. 104, was found subsequently to be erroneous. The moth mistaken for it at the time was *L. hellerella*, Dup. I may mention that *L. decorella*, Steph., occurs here regularly but rarely.—(Rev.) O. PICKARD-CAMBRIDGE; Bloxworth Rectory, Dorset.

LARVA OF CIRRHEDIA XERAMPELINA.—Having been very successful in obtaining larvæ of *C. xerampelina*, my method may be of interest. Briefly, the method is trapping them. I prop pieces of bark or wood against the trunk of the tree, or against neighbouring fences, &c., about two or three feet above the ground. Then whenever I happen to be in the vicinity I look under them, and if the tree harbours *C. xerampelina* my trap probably contains a few. This method has the advantage of enabling a large area to be worked for these larvæ with little trouble, as the traps can be set and examined at any time during the day. Incidentally, I find a good many squeezed in crevices in the bark of the tree, and also in natural hiding places such as under loose bark on neighbouring fences. The larvæ travel considerable distances, as I have found them concealed as much as twenty feet from the trunk of the tree.—SAVIGNAC B. STEDMAN; Binbrook, Market Rasen, Lincoln, May 22nd, 1908.

PALIMPSESTIS (CYMATOPHORA) OCTOGESIMA IN LONDON.—Might I record in the 'Entomologist' the capture of *Palimpsestis* (*Cymatophora*) *octogesima* on two different occasions last July at arc-lamps at West Hampstead, by Mr. P. Layman? Has it been recorded so near London before?—E. MANNERING; Trinity Clergy House, 74, Bolsover Street, W., May 25th, 1908.

[See also Entom. xxxix. 257.—Ed.]

NOTES FROM THE HASLEMERE DISTRICT FOR 1906 AND 1907.—Having now been in Haslemere for two seasons, I am beginning to find that, even with my limited leisure for collecting, it is a locality full of possibilities for the entomologist, and a short record of my experiences may be of some interest. I have at present discovered twenty-four species of Rhopalocera. Larvæ of *Zephyrus quercus* are very abundant, and any number of *Gonepteryx rhamni* can be bred from the alder-buckthorns, which are to be found plentifully; but the most interesting thing to me has been the breeding of an exceedingly varied series of *Chrysophanus phlæas*. Some were fed on dock, others on sorrel, but the proportion of specimens with blue spots on the lower wings was very great in each case. The variation in other respects was less marked. *Euchloe cardamines* is plentiful, and so is *Callophrys rubi*, and I have observed *Argiades sylvanus* ovipositing freely in a field where *Hesperia thaulas*, *Lycæna argus*, and many other insects are common. *Cyaniris argolus* was seen in some numbers during the spring of 1907, and from a batch of larvæ which began to pupate on Sept. 17th a forward male emerged on Oct. 15th, though the rest of the brood have stood over. Among interesting captures by day may be mentioned *Charocampa elpenor*, *Macroglossa stellatarum*, *Mitochrista mimata*, *Lithosia sororcula*, *Drepana binaria*, *Heliaca tenebrata*, *Erastria fasciana*, *Bomolocha fontis*, *Epione advenaria*, *Eurymene dolabraria*, *Asthena luteata*, *Bapta temerata*, *B. bimaculata*, *Numeria pulveraria*, *Bupalus piniaria*, *Lomaspilis marginata*, and *Melanthia albicillata*; *L. marginata* being very varied, and *E. advenaria* being in the greatest profusion.

Larvæ of *Hemaris fuciformis* and *Anarta myrtili* have been discovered, and the following larvæ have been beaten: *Hylophila prasinana*, *H. bicolorana*, *Lophopteryx camelina*, *Amphipyra pyramidea*, *Hadena protea*, *Gonoptera libatrix*, and many others. Ova have been obtained of *Pæcilocampa populi*, *Arctia villica*, *Dicranura vinula*, *Euplexia lucipara*, *Euclidia glyphica*, *Epione advenaria*, *Eurymene dolabraria*, &c.; and a very remarkable variety of *E. advenaria* emerged on April 8th, 1907. It is very much smaller than usual, and is of a uniform dull brown colour, with no markings to speak of. A more or less spasmodic examination of the street-lamps has produced several good things, including *Pæcilocampa populi*, *Lophopteryx carmelita*, *Notodonta trepida*, *Polyplocia flavicornis*, *P. ridens*, *Panolis piniperda*, *Erastria fasciana*, *Eurymene dolabraria*, *Selenia illustraria*, *Numeria pulveraria*, *Ligdia adustata*, *Lobophora carpinata*, *Anticlea nigrofasciaria*, *Cidaria suffumata*, and *C. silaceata*. The results from sugaring about thirty young fruit trees in my garden have been good, among other insects taken being *Thyatira batis*, *Dipterygia scabriuscula* (very abundant), *Apamea basilinea*, *Noctua triangulum*, *Xanthia fulvago*, *X. flavago*, *Aporophyla nigra*, *Agriopsis aprilina*, *Euplexia lucipara*, *Hadena gemstæ*, and *Xylina socia*.—F. A. OLDAKER, M.A.; The Red House, Haslemere, March 2nd, 1908.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, May 6th, 1908.*—Mr. C. O. Waterhouse, President, in the chair.—Mr. Thomas Godfrey Andros, Ph.D., F.Z.S., of Wilton House, 31, St. Saviour's Road, Jersey; Mr. Chourappa Chetti, Assistant Curator of the Government Museum at Bangalore, India; Mr. Frederick Charles Fraser, I.M.S., M.D., M.R.C.S., L.R.C.P., of Trichinopoly, India; Mr. Walter M. Giffard, of Keeaunoki Street, Honolulu, Hawaiian Islands; and Mr. Alfred Vander Hedges, of 42, Kensington Park Gardens, W., were elected Fellows of the Society.—Mr. A. H. Jones exhibited an example of the melanic ab. *nigra* of *Tephrosia consonaria* bred from a wild female taken near Maidstone, by Mr. W. Goodwin; and a living larva of *Sesia andreniformis* feeding in the stem of *Viburnum lantana*.—Mr. R. Shelford brought for exhibition a number of specimens of insects in amber. They showed several forms closely allied to those of existing insects: one orthopteron being very near to *Ectobia lapponica*.—The President, a living example of *Blatta* found among bananas from Mexico. Mr. Shelford said he thought the species to be *Pandora niveus*, Lin.—Mr. H. M. Edelsten, a living larva of *Nudaria senex*, and living larva and pupa of *Calligenia nuniata*. He drew special attention to the clubbed bristles on the former as being incurved and most curious.—Mr. O. E. Janson, a white aberration of *Epinephela jurtina*, taken in Holme Park, Sussex, in June, 1904.—Professor E. B. Poulton read a letter from Mr. S. A. Neave giving an account of the bulbul feeding its young with various "unpalatable" species. He also exhibited a collection of Asilids and their prey from the Tring Museum, and a series of *Neptis* from Madagascar to illustrate the specialization of this butterfly in its island form. A discussion on the developments of coloration in insular forms of this and other Lepidoptera followed, in which Dr. T. A. Chapman, Mr. G. A. K. Marshall, the Rev. G. Wheeler, Lt.-Col. N. Manders, and other Fellows participated.—Lieut.-Col. Manders, a collection of butterflies from Bourbon demonstrating examples of mimicry and the effects of the interaction of species. He concluded by describing the physical characteristics of the island, and said that the area favourable for the existence of *Euplocas* was extremely small, and as the larvæ of *goudoti* and *euphon* fed on the same plants there was in all probability a struggle for existence set up in which the invader proved the stronger and eventually exterminated its rival. In the discussion which followed Professor Poulton remarked that in the neighbouring island of Rodrigues there was a species of *Euplocas* (*desjardinsi*) greatly resembling *euphon*, and no doubt a geographical race of that species, and this would also suggest that *euphon* formerly existed in Bourbon.—Mr. H. St. J. Donisthorpe showed an example of the beetle *Xantholinus distans*, Kr., taken at Helton, near Dumfries, on May 1, a species new to the British list.—Mr. W. J. Lucas showed a glow-worm found at Oxshott on May 4, inside the shell of the snail *Helix cantiana*. There was no doubt that the larva was feeding on the snail, for on breaking away parts of the shell he found the moist remains of it near the apex. He also brought for exhibition the male, female, and nymph of the dragonfly *Oxygastra curtisii*, first de-

scribed by the late J. C. Dale, and read a paper on "The British Dragonflies of the 'Dale Collection.'"—Dr. T. A. Chapman, M.D., F.Z.S., read a paper on "The Distinction of Several Species of *Everes*, determined by their Genitalia," and exhibited photographs to illustrate his remarks. He announced that as the result of his investigations *Everes argiades*, Pall., and the so-called var. *coretas*, were separate, though very nearly allied species.—H. ROWLAND-BROWN, *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY—*April 9th*, 1908.—Mr. Alfred Sich, F.E.S., President in the chair.—Mr. Kaye exhibited an Agaristid moth, *Scirocastnia præfecta*, from Peru, which by its antennæ and general superficial characters closely resembled an Erycinid.—Mr. R. Adkin, a drawer of the various forms of *Angerona prunaria*, and another of *Boarmia repandata*. A discussion arose as to labelling insects geographically. It was suggested that a label of locality might be placed at the side below each set of a species from one locality. This would be impossible in a collection where the idea was merely to group the varieties.—Mr. South exhibited several species of *Cucullia*, with a view to gain some definite idea as to what the species *C. scrophulariæ* really was. Considerable discussion took place, but no definite result was arrived at.—Mr. Sich exhibited a number of "house moths," some eleven species, including *Endrosia fenestrella*, *Borkhausenia pseudospretella*, *Tinea pellionella*, *T. pallenscentella*, *T. fuscipunctella*, *Tineola biselliella*, &c., and read a short paper on his exhibit. A discussion took place as to the ravages of these pests.

April 23rd, 1908.—The President in the chair.—Mr. R. Adkin exhibited a specimen of *Argynnis aglaja* with the left fore wing only about half-size, but otherwise perfect. It was taken at Eastbourne. He also showed a larva of *Tortrix pronubana* with a parasitic larva attached to its under surface.—Mr. Gadge, light forms of *Orgyia antiqua* and *Rumicia phleas*.—Mr. Kaye, an asymmetrical form of *Anticlea baduata*.—Dr. Chapman, living larvæ of *Polyommatus icarus* and *Plebius argus* (*ægon*), the former quite and the latter nearly full grown.—Mr. Newman, stems of *Viburnum* containing larvæ of *Sesia andreniformis*, larvæ of *Camptogramma fluviala* and *Agrotis ashworthii*, and imagines of *Cucullia scrophulariæ* and *C. verbasci*.—Mr. Moore, two Indian Pierids, *Catopsilia catulla* and *Delias eucharis*, with bleached wings.—Mr. R. Adkin, specimens of *C. scrophulariæ*, *C. verbasci*, &c., *C. lychnitis*, for comparison.—Mr. Step, photographs of *Helleborus fœtidus*, and read notes on its fertilisation, &c.—Mr. Main, larva, pupa, and imago of the meal-worm *Tenebrio molitor*.—Mr. Sich, specimens of *Xanthia fulvago* (*cerago*) var. *flavescens* from Forres.—Mr. Rayward made some remarks on the life-history of *S. andreniformis*.—HY. J. TURNER, *Hon. Rep. Sec.*

HERTFORDSHIRE NATURAL HISTORY SOCIETY.—Mr. A. E. Gibbs, F.L.S., recorder of Lepidoptera, presented his annual report at a meeting held at the County Museum, St. Albans, on May 12th, and referred to the fact that very few insects which needed more than a passing mention were met with during the year. His local correspondents, who, he regretted to say, were a decreasing band, united in describing the season as a disappointing one. It was sunless, cold and damp—

conditions which were unfavourable to insect life. The only species which had been added to the county list of Lepidoptera was *Hyphenodes costastrigalis*, taken at Ashridge on July 24th and August 22nd by Mr. A. T. Goodson, of Tring. Mr. Gibbs referred to the comparative abundance in his garden of *Agrotis saucia*, an insect of which he had not previously taken more than one or two specimens in a season. He obtained ova and fed up fifty-one larvæ in a warm kitchen, forty-four moths emerging between March 4th and 11th of the present year. These in turn gave a few ova, which were successfully photographed by Mr. A. E. Tonge, F.E.S., of Reigate. Reports of work done and observations made during the season were received from Miss Alice Dickinson, New Green's Farm, St. Albans, Mr. P. J. Barraud, F.E.S., of Bushey Heath, Mr. A. H. Foster, of Hitchin, Mr. J. E. Perrott, of Watford, and Mr. A. T. Goodson, of Tring.—A. E. GIBBS, *Hon. Sec.*

RECENT LITERATURE.

A Guide to the Exhibited Series of Insects.

APART from the huge collection of insects housed in the basement of the Nation's Natural History Museum at South Kensington, there is, in one of the galleries on the main floor, a series of twenty-eight table cases arranged over the central area, three or four cabinets along the borders, and an assortment of cases on the walls. Two of the table cases contain material illustrative of Structure and Classification of Insects, and in the others are shown specimens belonging to the nine Orders of Insects, here arranged in the following sequence:—Aptera, Orthoptera, Neuroptera, Trichoptera, Lepidoptera, Hymenoptera, Diptera, Coleoptera, and Rhynchota. In two of the cabinets are perfect insects and caterpillars of British Lepidoptera, and British and Foreign insects are in the others.

Furnished with a copy of this excellent illustrated guide of some sixty pages, the visitor will find examination of the various objects invested with an interest which might be lacking without such a handy instructor.

A Natural History of the British Butterflies.

IN the last volume of the 'Entomologist,' p. 256, the first eleven parts of volume ii. of this elaborate work by Mr. J. W. Tutt were referred to. Parts xii.—xxi. of the same volume are now to hand. There are one hundred and fifty-three pages of text, of which thirty-two are introductory, twenty plates, and explanations thereof on separate pages. The subject-matter comprises *Euralis* (*Zephyrus*) *betula*, pp. 296–320; Tribe Lampididi, Genus *Lampides*, Hübn., pp. 329–331; Tribe Celastrinidi, Genus *Celastrina*, Tutt, pp. 332–386; *C. argiolus*, L., pp. 387–416 (part). One of the plates gives photographic figures of the butterflies *L. baticus* and *C. argiolus*, and the others show life-histories and structural details of larvæ and pupæ; all the latter are greatly enlarged. The parts, which are issued monthly, are published by Elliot Stock, Paternoster Row, E.C.

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JULY, 1908.

[No. 542

LIFE-HISTORY OF *LYCÆNA ACIS*.

By F. W. FROHAWK, M.B.O.U., F.E.S.

On July 1st, 1907, I received from Prof. Rebel, at Vienna, four living females of *Lycæna acis*, who kindly sent them to me at the request of the Hon. N. Charles Rothschild. I am, therefore, indebted to both these gentlemen for their kind assistance in procuring me living examples of this extremely rare British species.

I at once placed all four females on growing plants of *Anthyllis vulneraria*. On July 5th I noticed a few eggs were deposited, and several more on the following day; in all from thirty to thirty-six ova were laid on the calyces of the flowers, mostly near the base, and often hidden between them.

The egg is very similar to that of *L. arion*, being of the same size—*e.g.* $\frac{1}{40}$ in. wide—but slightly higher ($\frac{1}{36}$ in.) and of similar structure; the micropyle, however, is much smaller, and but slightly sunken, resembling in this respect the egg of *L. argiades*. The whole surface is covered with a beautiful reticulated network pattern; the reticulations surrounding the micropyle are simple, but gradually develop at each juncture into raised knobs, which are prominent elsewhere over the surface. All the reticulations resemble white-frosted glass, reflecting the beautiful pale blue-green ground colour of the egg. Shortly before hatching it assumes a greyish tinge. The egg-state lasts ten days. The eggs laid on the 5th hatched on the 15th. The young larva makes its exit by eating a small hole in the side of the egg just large enough to allow of its escape.

Directly after emergence the larva is very small, being only $\frac{1}{30}$ in. long, but stout in proportion. It is almost exactly similar in all respects to *L. arion*, except that the hairs of *acis* are longer and the general colouring of the body is of a greener tinge. It has a shallow dorsal longitudinal furrow; on the first segment, which is the widest, there is a large dorsal disc and a smaller one on the anal segment; both are some-

what glazed and grey in colour. The body is a pale greenish blue-grey, with citrine-yellow shadows; along the dorsal surface are longitudinal rows of very long and also short glassy white, finely serrated hairs, placed in pairs on each segment bordering the furrow, the first one very long, the second short; both curve backwards, and have dark olive-brown pedestal bases; below are two very small hairs projecting laterally; the spiracles are large and dusky. On each segment are three subspiracular hairs, which are long and project laterally also; the central one is very long. Below on the lateral lobe are two other similar but shorter hairs, and others on the claspers; they all have dark bulbous bases. The head is shining brownish black. The entire surface is sprinkled with blackish points. The eggs and claspers are the same colour as the body.

On July 19th I carefully examined the flowers, and found the young larvæ had eaten through the base of the calyces, and were feeding on the green seed-pod within.

One of the butterflies lived until July 20th.

On July 23rd I again examined some of the flowers, and found two larvæ in the second stage; another undergoing the first moult, and others in the first stage feeding on the seed-pods.

Shortly before first moult it measures only $\frac{1}{16}$ in. long, and is pale ochreous yellow.

After first moult it is a good deal similar to the previous stage, but has additional hairs and three subdorsal spiracular-like discs on either side of each segment, and one sublateral; the surface is covered with greyish raised points. On the first segment is a dorsal shield-like disc, slightly sunken, and of a dull olive-colour, beset with little circular discs varying in size. The colour is pale ochreous, with faint longitudinal medio-dorsal and lateral lines and oblique side-stripes of a slightly darker ochreous.

Before second moult it is $\frac{1}{8}$ in. long. The colouring is paler and markings more indistinct. In some specimens the colour is almost uniformly of a pale ochreous yellow. They still feed on the seeds.

Before third moult it is $\frac{3}{16}$ in. long, the segmental divisions are deeply cut, the body is thickly studded with white serrated hairs, each with an ochreous-brown tubular base and black spiracular-like discs. On the tenth segment is a dorsal transverse gland, very similar to that of *L. arion*; at the edge are a few minute white hairs with branching tips. I noticed a tiny bead of liquid exuding from it. The dorsal disc on first segment is fan-shaped, with a glazed surface beset with minute discs, as in previous stage, but has in addition three hairs. The whole colouring of the body is pale ochreous yellow, with medio-dorsal, subdorsal, and subspiracular pale rust-red stripes, which are

broken up on each segment, being composed of a series of short bands, and those forming the subdorsal series are slightly oblique; the lateral stripe is continuous round the broad, rounded, and somewhat flattened anal extremity; the head is black and shining. Some specimens are paler than others, and some are distinctly yellow after feeding on the yellow petals of the flowers. They feed on all parts of the bloom. In general appearance and structure they are very like *L. arion* larvæ, but less pink in colour.

Besides the flowers of *Anthyllis vulneraria* the larvæ of *acis* feed readily on clover-blossoms both white and pink, but for choice prefer the pink, which they greedily devour, eating all parts of the blossom.

During the second week of August most of the larvæ entered into hybernation; some I found concealed within the calyces of the *Anthyllis*, and others under the leaf-like bracts and also between the calyces. Although several were kept in a warm temperature, with early morning sunshine, and during the warmest days of the summer, they all remained motionless.

During the first week in September I placed a few of the larvæ out of doors (these were hybernating on flower-heads of clover and *Anthyllis*); the pots containing the plants were only protected by gauze covers, so they were subjected to all conditions of weather throughout the autumn and winter—therefore, were practically kept in a natural state. On January 20th, 1908, I examined a pot kept out of doors, and found on a brown dead clover-bloom one larva apparently perfectly healthy, which had not moved since the middle of August; also, on a dead flower-head of *Anthyllis* there was another in a similar condition.

Again, on February 22nd, I carefully examined the plants kept both out of doors and in a cold conservatory, and found altogether nine larvæ, all apparently very healthy and hybernating. These had not moved at all since entering into hybernation; some were between the calyces of the dead *Anthyllis*, and very difficult to detect, while others were hidden within them; some on the leaf-bracts, and one on a dead *Anthyllis*-stem at the base of a withered leaf, and two on dead clover flower-heads between the petals. In all cases the larvæ were resting with their heads pointing inwards, towards the base of the flowers.

On March 20th three larvæ moved from their hybernaculums, the others remained motionless. Having no other likely food-plant for these larvæ, I placed them on three separate blossoms of furze (*Ulex europæus*), upon which they remained without feeding for a time. On the morning of March 24th I noticed one had been feeding on the inside cuticle of the calyx, and another I saw feeding on the petal of another blossom. This

day being warm with considerable sunshine, three more left their hybernaculums. I therefore gave them young shoots of clover, on which they fed, perforating the leaves, and also bored into the swollen shoots enveloping the young leaves, feeding on the interior in the same way as *L. argiolus* larvæ feed on young holly-berries. The following days they continued feeding at times.

On April 1st another left its hybernaculum.

Third moult: on April 8th the first one moulted the third time, followed by one moulting on the 9th, another on the 10th, and others fixed for moulting on the 11th.

Before third moult, two hundred and thirty-nine days old, it measures $\frac{1}{6}$ in. long when fixed for moulting. Of a very pale yellowish flesh-colour; all the markings dull pale pinkish, giving the larva a pale flesh-coloured appearance.

One of those which left its hybernaculum on March 20th was kept solely on furze-bloom, and moulted the third time on April 15th. They remain some days fixed for moulting.

After third moult, two hundred and forty-five days old, it measures $\frac{1}{5}$ in. long. The ground colour is now of a pale ochreous green, with the dorsal, subdorsal, and lateral stripes dull pinkish drab; otherwise it is very similar to the previous stage, excepting it is more densely studded with hairs of varying lengths; each with a darker green truncated swollen base encircled with a series of black points; there are also numerous spiracular-like discs; a gland on the tenth segment, and on the eleventh segment below and behind each spiracle is a retractile tubercle. They continued feeding on the tender shoots of clover, preferring the young expanding heads of the plant, and feed at all times during the day.

Fourth moult, April 26th. After this moult the larva is wholly of a clear green colour.

After fourth and shortly before moulting the fifth time it measures $\frac{3}{10}$ in. long. Similar to previous stage, excepting the hairs are longer, and the ground colouring is a clear light green, with darker green but somewhat indistinct markings.

On May 2nd two fixed for fifth moult; one moulted late afternoon of the 4th, the other early on the following morning; while on this day four others were fixed for the fourth moult, and one feeding in the same stage; also one larva still in the third stage, which remained in partial hibernation, as it shifted its position on May 3rd, but not then left the dead part of the plant which formed its hybernaculum. This one again moved on May 17th, when I placed it on a clover-blossom, upon which it rested for a week, and died on May 25th, having lived for about two hundred and eighty days without feeding.

The one that moulted on May 4th for the fifth and last time became fully grown and spun up for pupation on May 17th, and

pupated ten a.m. on the 19th, the last stage occupying fifteen days.

After fifth and last moult fully grown, about two hundred and seventy-five days old, it measures $\frac{7}{12}$ in. long. In shape and size it greatly resembles *L. arion* larva. The small shining black head is set on a moderately long retractile neck, which is frequently protruded beyond the first segment while it is crawling and feeding, which, when at rest, is completely withdrawn and hidden in the segment. Although the head is disproportionately small for the size of the larva, it is more than twice the size of the minute head of *L. arion* larva.

Dorsal view: The anterior and posterior segments are overlapping and rounded; the body narrowest anteriorly, widening to the eighth segment. The segmental divisions are deeply cut, each segment boldly convexed. Side view: First anterior and last three posterior segments flattened and projecting laterally; second to ninth segments are humped dorsally; a slight medio-dorsal furrow; the sides sloping and lateral ridge dilated, ventral surface bulbous and ample. The whole body is rather densely sprinkled with finely serrated spinous hairs; the longest are along the dorsal surface and lateral ridge, where they form a projecting fringe all round the larva, and the first two segments are also covered with longish hairs, and a few are scattered along the subdorsal region; all these longer hairs are pale brownish, becoming whitish towards the base, which is in the form of a pedestal, and of a greenish white colour; the other hairs are very minute, white, and glassy. On the first segment is a fan-shaped whitish dorsal disc, studded with shining black raised processes and tiny white hairs; scattered over the body are shining black spiracular-like discs, very small, common to the *Lycænidae* larvæ. On the tenth segment is a transverse gland, very like that on the same segment of *arion* larva, but in *acis* it is not fringed with the extremely minute branching hairs, but is instead surrounded by numerous little circular discs and tiny white simple hairs; and on each side of the eleventh segment is a retractile whitish tubercle; the claspers and ventral surface are glaucous; the legs whitish, ringed with dark olive.

The larva which entirely fed on furze-blossoms since hybernation pupated on May 22nd, and produced a fine male imago on June 7th. This larva remained a much paler colour, being a pale greenish yellow-ochreous, and the pupa was likewise pale in colour.

The larvæ spun themselves up on different parts of the plants, both on the stems, leaves, and flowers; in each case a very slight cocoon was formed by a few strands of silk, and also attached by the hind claspers to a pad of silk and a cincture round the middle.

The pupa averages in length $\frac{5}{12}$ in.

Dorsal view: The head is obtuse, from the base to middle of wing the outline is straight, then swelling to second and third abdominal segments; abdomen attenuated to the rounded anal segment. Side view: The head rounded, with slight swellings at base of antennæ; thorax convex; division between first and second segments forming an obtuse angle; abdomen slightly swollen and curving to rounded anal segment; ventral surface forms almost a straight line, in which respect it mainly differs from *L. arion* pupa. The cremastral hooks number in all twenty-four, and are placed in two distinct patches of twelve each.

The entire surface (like *arion*) is covered with very fine brown reticulations, and, excepting the wing, is sprinkled also with minute circular discs; these are especially numerous on the head and prothorax; also sprinkled over the surface are finely serrated whitish bristles. On each side of the prothorax is a small patch of bristles with their ends finely ciliated. The dorsal gland of the larva is modified into a slight suture, marked in the centre by a brown spot.

When first pupated it is a clear transparent green, showing the nervures of both the primaries and secondaries and the general internal structure; it gradually assumes an ochreous tinge at both ends, and the darker dorsal line (dorsal vessel) can be seen pulsating as in the larva.

When four days old it is mostly of a dull ochreous green; thorax whitish green; head and anal segment pale pinkish buff; neuration of both wings still showing.

When nine days old and normal the colour is a pale ochreous green; wings palest, inclining to whitish; head, prothorax, and anal extremity tinged with rust-red, caused by the density of the reticulations and discs; spiracles whitish; nervures still showing under the thin pupal skin.

On the twelfth day the maturing of the imago commences by the eyes becoming a pale reddish drab and the wings opaque cream-colour; the eyes daily deepen, and wings become paler and more opaque. On the fifteenth day the eyes are dark brown; wings, thorax, and head light tawny buff; abdomen greenish ochreous. On the following day the whole colouring is quickly transformed into black, blue, and grey. In the males the wings are then rich deep metallic-blue at the base, blending into light greenish blue, forming the median area; the rest of the wing black, and black nervures crossing the blue; outer border creamy white; the eyes, thorax, and dorsal half of abdomen steel-black; ventral surface olive. A few hours before emerging the blue of the wings assume a silvery grey, and all the hair-scales of the body show clearly through the thin delicate texture of the pupal skin, giving the whole a silvery-grey appearance.

The pupa is attached to the food-plant by the cremastral

hooks and a cincture round the waist, and a few strands of silk spun around it, forming a slight cocoon.

The first imago (a male) emerged on June 5th; it pupated on May 19th, making the pupal period seventeen days. Others emerged at intervals during the first half of June, in all five males and one female—all fine specimens.

Hitherto the life-history of *L. acis* has remained a blank to British entomologists, and by the meagre descriptions given by the various authors concerning the larva and pupa, obviously copied from Rühl, very little appears to be known to the Continental authors. Certainly Rühl's description is confusing and misleading, as he states the larva is full-fed in August, changes to a pupa in September, and passes the winter in that stage.

DRAGONFLIES IN 1907.

By W. J. LUCAS, B.A., F.E.S.

IN 1907 I seem to have met with little that was worthy of record in connection with the British Odonata. The season was not an early one, the first dragonfly observed being a male *Pyrrhosoma nymphula* at the Black Pond, Surrey, on May 5th. In my experience, however, there was no dearth of specimens of the various species as time went on, whatever may have been the case with insects of other orders.

At the beginning of September *Sympetrum striolatum* was very common in the New Forest, and no doubt it continued on the wing as usual till well towards the end of the year, but the last specimen noted by myself was on Bookham Common, Surrey, on September 22nd. *Sympetrum sanguineum* was present on Ockham Common, Surrey, on September 8th, and on the following day I captured the species at the Black Pond, where I had not previously met with it.

Mr. A. O. Rowden tells me that on July 21st he took *Orthetrum cærulescens* at Tavy Cleave on Dartmoor, and Mr. G. Nicholson gave me a female example of its congener, *O. cancellatum*, taken at Wroxham, in Norfolk, in August, which had caught a *Vanessa urticae*. On July 31st *Cordulegaster annulatus*, which was common in one of the rides in Dames Slough Enclosure in the New Forest, seemed in some cases to be pursuing the butterflies which were also numerous there. On August 2nd, also in the Forest, I saw an *Anax imperator* hovering over a boggy pool near Beaulieu River, and found a bodyless *Pieris napi* on the surface of the pool, which I concluded had been captured and mutilated by the dragonfly. The same day *Lestes sponsa*, a common species, but one I have not often met with in the New

Forest, was taken near Beaulieu River. *Ischnura elegans* was received from Bedford, having been captured on August 22nd.

As regards the two New Forest species, *Ischnura pumilio* and *Agrion mercuriale*, the former was met with on August 5th at a new spot, though not a great way from one of its known haunts, while the latter also was discovered on August 24th some mile or two from any spot at which it had previously been noted. A few years since, in a so much examined place as the New Forest, the former was quite unknown, and the latter almost so; now both are found to be common. It is therefore quite likely that here and elsewhere new dragonflies of the smaller species will reward the searcher, just as did *Agrion hastulatum* in Scotland and *Agrion armatum* in the Broads. These last did not receive attention during 1907, but Mr. J. J. F. X. King tells me that when last he visited the home of *A. hastulatum* on the River Spey he took only a few specimens after very hard work.

On October 27th, a very dull but moderately mild day, I caught a brightly marked female *Æschna cyanea* on the wing about mid-day on Esher Common, Surrey. Not only was this the last dragonfly noted for the season, but this date was the latest on which I have myself met with the species, though I have a record of one being found alive in Gloucestershire on November 12th.

ODONATA IN GERMANY.—II.

By E. R. SPEYER, F.E.S.

IN the first part of this paper (*ante*, p. 116), fifteen species of the larger dragonflies were recorded. In the present one there is an account of the smaller ones which were observed at Marburg-on-the-Lahn in the summer of 1907.

Calopteryx virgo, Linn.—This beautiful species was out in a very immature state on May 23rd, and was then difficult to distinguish from *C. splendens* at first sight. On June 27th mature males were not uncommon along the river towards Bürgeln, but females were absent. A male and female (the latter with a deformed abdomen) taken on August 3rd were the last observed specimens.

C. virgo must spend a great deal of its time far from water, but it is not nearly so plentiful as *C. splendens*.

C. splendens, Harris.—The dragonfly was plentiful everywhere except in the brickyard. The first specimen, an immature male, appeared on the bank of the river towards Giessen on May 25th, and from June 2nd till August 3rd the species was exceedingly plentiful; after the latter date it began to die off, and it was not observed after August 29th. There were actual

swarms of the species for miles along the river on June 27th, but I did not find any variety in size or colour, although I was on the look-out for abnormalities.

Lestes viridis, Lind.—The species is evidently found in localities where the surroundings are suitable, for I took it at the pond near the Southern Railway Station only, and even there it was uncommon. In August and September the male was sometimes more or less plentiful, but only four females made their appearance to me during the whole summer.

It was the habit of the male to fly rather rapidly and jerkily, and to settle on the highest reed-tops with half-expanded wings; the whitish pterostigma and anal appendages were then very conspicuous, but the insect was hard to see while flying, as its colour harmonized perfectly with the surroundings. I repeatedly watched males at the top of a poplar-tree; occasionally they would fly down into the reeds, where they could be netted.

The flight of the female is slower. Of oviposition I saw nothing, but possibly it is the same as in *L. sponsa*, for the two mature females which were taken were put up by beating the reeds. On August 3rd the species made its first appearance, and as it was still fairly plentiful on September 23rd, I conclude that it lasts into October.

L. dryas, Kirby.—The insect was found in the marsh, and there it was plentiful in September. A single female was taken at the pond near the Southern Railway Station on August 27th, but this must have been a stray specimen, as I did not take another there.

This dragonfly is distinguishable from *L. sponsa*, even on the wing, by its larger size and darker colour.

L. sponsa, Hans.—On July 7th this species was out, and was very plentiful in all the localities, except in the brickyard, until the end of September.

Sympyga fusca, Charp. — This most interesting species appeared first in a perfectly mature condition on June 9th at the pond adjoining the Lahn. On June 13th I again took mature specimens at the pond near the Southern Railway Station; on June 16th I took a single male only at the former locality.

Not until August 25th did the dragonfly appear again, and then it was very plentiful in both the localities mentioned, but in a very immature state. After this I did not observe it again. This surely points to the hybernation of the species, which dies off in June, the new generation emerging from the nymph in August, as De Selys points out in his 'Monographia' (1840, p. 146). When immature, the dragonfly no doubt spends its time far from water. I never observed the female ovipositing; perhaps oviposition takes place in October. The species flies close to the water, where it is difficult to see.

Platynemis pennipes, Pall.—Of the Zygopterides observed

this was one of the most plentiful. It was out on the banks of the Lahn towards Giessen on June 2nd in large numbers, and on September 2nd I still took specimens. In June and July it was plentiful in fields, and I took several specimens on bushes on the sides of the mountains on June 18th.

When immature I took var. *lactea* only, but later var. *bilineata* and the normal form were also abundant.

Erythromma najas, Hans.—On May 25th the dragonfly was out along the river. In June it was plentiful at all the localities with the exception of the brickyard and marsh; but in July it became scarce, and on July 8th I thought I had seen the last of it. But on August 3rd I took a single male at the pond near the Southern Railway Station.

On the under side of the bodies of males there were often large numbers of red *Acari*.

E. viridulum, Charp.—I found this minute dragonfly at the pond near the Southern Railway Station. On July 22nd it was not very plentiful, and all the specimens taken were very immature; in this state they were difficult to distinguish from *Ischnura pumilio*. The female was at this time the more plentiful. On August 3rd both sexes were very abundant, and they continued to be so till August 31st. On September 9th I took two specimens only, and on September 23rd again two; the latter were worn.

The habits of this species are rather similar to those of its larger congener, but it is less shy and does not fly over the water so much. The dragonfly does not go far from water when immature, but flies slowly about bushes close to its native pond.

On August 27th a male of this species was found in the jaws of the female *L. dryas* taken at the pond near the Southern Railway Station.

Pyrrhosoma nymphula, Sulz.—Although more or less well distributed, the dragonfly was never at all plentiful, and the time of flight was short, unless it was spent far from water. On June 9th I took the first specimen, and on June 13th it was not uncommon, but after June 27th I did not notice it again until August 3rd, when I took a single male. The brickyard and the marsh were the only two places where I did not find it. Perhaps the species is more abundant in favourable summers.

Ischnura pumilio, Charp.—On May 23rd a single immature male was taken in the brickyard. I did not record it again, and cannot account for its appearance.

I. elegans, Van der Linn.—Was as common as *P. pennipes*. As early as May 25th I took specimens in the brickyard, and it was abundant everywhere until August 31st, after which date I did not observe it. The female var. *rufescens* was plentiful, but the normal forms were more numerous.

Agriion pulchellum, Lind.—On May 25th several females

NAME OF SPECIES.	MAY	JUNE	JULY	AUG.	SEPT.	FIRST OBS.	LAST OBS.	REMARKS.
<i>Sympetrum striolatum</i> ..	—	—	—	×	×	Aug. 27	Sept. 9	
" <i>vulgatum</i>	—	—	—	×	×	Aug. 25	Sept. 23	
" <i>sanguineum</i> ..	—	—	×	×	×	July 8	Sept. 23	
" <i>flaveolum</i>	—	—	—	—	×	Sept. 2	Sept. 8	Probably out in August and lasts till October.
" <i>scoticum</i>	×	×	×	—	×	Sept. 2	Sept. 8	Probably out in August and lasts till October.
<i>Libellula depressa</i> ..	—	—	×	—	—	May 23	July 21	Only one specimen observed.
" <i>quadrimaculata</i>	—	×	×	×	—	July 8	Aug. 27	
<i>Orthetrum cancellatum</i> ..	×	×	×	×	—	June 10	Aug. 8	
<i>Cordulia aenea</i>	×	—	—	×	—	May 12	Aug. 3	Only one specimen observed.
<i>Somatochlora metallica</i> ..	×	—	—	×	—	May 23	Aug. 8	Probably lasts into June. Empty nymph-case on
<i>Gomphus vulgatissimus</i> ..	—	×	—	—	—	June 27	May 25	Seen on three occasions only.
<i>Lindenia forepata</i>	—	—	×	?	×	Aug. 27	Sept. 19	Probably lasts well into October.
<i>Æschna cyanea</i>	—	—	—	×	×	Aug. 26	Sept. 19	Probably lasts until beginning of October.
" <i>grandis</i>	—	—	×	×	×	Aug. 3	Sept. 8	Only two specimens observed.
" <i>asocetes</i>	×	×	?	×	—	June 28	July 16	
<i>Calopteryx virgo</i>	×	×	×	×	—	May 23	Aug. 3	
" <i>splendens</i>	—	—	—	×	×	May 25	Aug. 29	
<i>Lestes viridis</i>	—	—	—	×	×	Aug. 3	Sept. 23	Probably lasts longer.
" <i>dryas</i>	—	—	—	×	×	Aug. 27	Sept. 8	Probably lasts into October.
" <i>sponsa</i>	—	—	—	×	×	July 7	Sept. 23	Two appearances.
<i>Sympycna fusca</i>	—	—	×	×	×	June 9	Aug. 25	
<i>Erythronma nairas</i>	×	×	×	×	—	May 25	Aug. 3	
" <i>viridulum</i> ...	×	—	×	×	×	July 22	Sept. 23	
<i>Pyrithosoma nymphula</i> ..	—	×	—	×	×	June 9	Aug. 3	July probably spent far from water.
<i>Platycnemis pennipes</i>	×	×	×	×	×	June 2	Sept. 2	
<i>Ischnura pumilio</i>	×	—	×	×	×	May 23	May 23	Only one specimen observed.
" <i>elegans</i>	×	×	×	—	—	May 25	Aug. 31	
<i>Agriocneme pulchellum</i>	×	×	×	—	—	May 25	July 19	
" <i>puella</i>	×	×	×	×	×	May 19	Sept. 8	
" <i>lindenii</i>	—	—	—	—	×	Sept. 19	Sept. 19	Only one specimen observed.
<i>Enallagma cyathigerum</i> ..	—	×	×	×	—	June 9	Aug. 31	

were out along the banks of the Lahn towards Giessen. I did not observe the species again until June 10th, when I took males only at the pond adjoining the Lahn. After this it was sometimes plentiful in all the localities except in the brickyard. On July 19th the last specimens were observed.

The dragonfly was subject to great variation in size, and in some males the blue markings on the abdominal segments were considerably reduced.

A. puella, Linn.—The dragonfly was common everywhere during May, June, and July. In August it became scarce, but it lasted till September 8th, when I took the last specimen observed, a male.

A. lindenbergi, Selys.—This interesting species appeared once only. On September 19th, while walking along the edge of the pond near the Southern Railway Station, I drove a mature male out of the grass.

This dragonfly is at once distinguishable from other Agrionids by the anal appendages, which are semicircular, rather reminding one of the genus *Lestes*. The abdomen is also curiously thickened towards its extremity. A separate genus will no doubt be allotted to this dragonfly.

Enallagma cyathigerum, Charp.—This dragonfly was plentiful from June 9th till August 31st. I took one specimen of the blue variety of the female on July 19th.

Owing to the wet weather experienced during the summer, it is probable that several species did not appear. Representatives of the genera *Anax*, *Brachytron*, *Æschna*, *Libellula*, *Gomphus*, and *Orthetrum*, not observed, no doubt occur at Marburg, and Mr. Morton suggests *Cordulia flavomaculata* also.

FIELD NOTES ON BRITISH SAWFLIES.

By CLAUDE MORLEY, F.E.S., &c.

THE Rev. F. D. Morice's invaluable "Help-Notes towards the Determination of British Tenthredinidæ," which have been appearing in the Ent. Mo. Mag. since 1903, and are still far from completion, have so stimulated hymenopterists in the study of our indigenous sawflies that an account of those with which I have personally met during the course of the last twelve or thirteen years may not be without some slight, though, I fear, more or less local, interest. Mr. Morice has not pretended to treat of the distribution, comparative frequency, habits, or economy of these insects, concerning which little or nothing has been published (as far as I am aware) since the completion of Cameron's Monograph in 1892. I will at once state that I have no especial knowledge of this group of insects, that my acquaint-

ance with it is confined to the field, and that it is to Mr. Morice's kindness and to that of Rev. E. N. Bloomfield and Miss Chawner that I owe the identification of all my specimens.

The Lydidae are divided into three subfamilies—the Lydini, Cephini, and Xyelini (for which the suffices *-ides*, as in the Tenthredinidae s.s., would be more uniform)—and all the species of the first division appear to be of uncommon occurrence. The late Mr. Alfred Beaumont has given me a single *Neurotoma flaviventris*, labelled “York, Hawkins, 1893,” and on June 3rd, 1898, I beat from white poplar in Bentley Woods, near Ipswich, the only two females of *Pumphilus sylvarum* I have ever seen, though the same spot was constantly worked from 1892 to late in 1904. Beaumont also gave me *P. balteatus* and *P. hortorum*, both of which he captured at Gosfield, in Essex, in June, 1902; and the late Mr. A. J. Chitty took *P. depressus* at Pamber Forest at the beginning of June, 1904. I have, in like manner, once in 1894 taken two *P. sylvaticus* in the Bentley Woods, but never seen it there again. The Cephini, as a whole, are much commoner, and I have them all. *Macrocephus linearis* has thrice occurred to me at Rockland and Surlingham Broads, in Norfolk, by sweeping the marsh herbage in very boggy places, and in a high dry pasture on an oxeye daisy to the east of Yarmouth, in the Isle of Wight, in June; my single *M. satyrus* was captured by Beaumont at Lyndhurst, in the New Forest, June 5th, 1897. Of *Cephus*, *C. pallidipes* is, perhaps, the rarest, or at least most local; in Suffolk it has only occurred to me from June 17th to July 5th, at Barnby Broad, Henstead, Tuddenham Fen, and Moulton, but in the middle of last June I found it in countless multitudes on the Red Cliff at Sandown, as well as at Yarmouth, Parkhurst; and, in the New Forest, at Matley Bog. *C. pygmaeus*, with its curious parasite *Collyria calcitrator*, Grav., is abundant about cornfields everywhere from the end of May to September 24th, though *C. pilosulus*, which is much mixed with it, is confined, in my experience, to June, and is much less common. *Janus cynosbati* was captured at Brandon, in Suffolk, by Chitty early in June, 1903, and Beaumont took *Calameuta filiformis* at Oxshott on May 23rd, 1897. The distinct *Trachelus tabidus* I have always found on the flowers of *Heracleum sphondylium* in June and July; it was especially common at Moulton in 1899, and has also turned up at Boxford, Claydon, and Bentley Woods, where I have thrice beaten the rare *Xyela julii* from the branches of *Pinus sylvestris* between April 9th and May 11th. Beaumont records it from Oxshott on May 3rd (Ent. Mo. Mag. 1897, p. 257).

Of our five species of Siricidae—or should I say six? (cf. Ent. Record, 1908, p. 63)—*Xiphydria prolongata* has once occurred to me in plenty at Mildenhall, in Suffolk (cf. Ent. Mo. Mag. 1899, p. 190), and both *Sirex gigas* and *S. noctilio* (*juvencus*, Brit. Cat.)

are not uncommon, especially in 1898 (*cf.* Ent. Mo. Mag. 1898, p. 213). Both the latter species are now known to be indubitably indigenous, and both are preyed upon by the handsome ichneumon *Rhyssa persuasoria*, Linn., several females of which were flying round holes whence I cut both sexes of *S. gigas* in fir-poles at Horning Ferry, in the Norfolk Broads, in June, 1901. Several species of this family are, however, introduced. Leonard Jenyns took *Sirex duplex*, Shuck. (*cæruleus*, Fab.) commonly among spruce-firs at Fulbourne in June and July, 1837, and Mr. Robert Godfrey sent me on June 22nd, 1907, a live male of *Tremex columba*, Linn., three of which had just emerged from a several-year-used maple beam in Glengowan Print Works, which had constantly been in boiling starch at a temperature of 70° Fahr. I possess *S. noctilio* from Leamington and Westgate-on-Sea.

I have met with but a small percentage of the Cimbicidæ, and have given a detailed account of *Cimbex connata*, with a mention of the subterranean pupation of *C. femorata* (Ent. Mo. Mag. 1905, p. 214). I possess three species of the involved genus *Trichiosoma*, of which one—the common hawthorn species, *T. lucorum*, Linn., I believe it to be—has the abdomen quite dull throughout, with distinctly brown pilosity, and the other two somewhat metallic abdomens, with distinctly grey pilosity, with or without rufescent markings. Those with the upper margins and whole under side of the abdomen red are *T. silvatica* of Mr. Morice's table, and that without such markings is undoubtedly *T. latreillei*. Both of these seem rare; I have but a pair of the former from "larvæ on birch in Scotland" (Peachell) and "New Forest, 1892" (Gulliver), and only one of the latter, which I beat from white poplar in the Bentley Woods, June 10th, 1895. I have given a long account of the parasitism of *Spilocryptus cimbicis* on *T. "oxyacanthæ,"* with a figure of the latter's pupa ('British Ichneumons,' ii. 273), and pointed out that the colour of the tibiæ is purely sexual (*cf.* Ent. Mo. Mag. 1904, p. 127). I first bred them from their powdery larvæ at Epsom College in 1889. The glorious *Abia sericea* occurs in August at Tuddenham Fen, Barnby Broad, and Henstead Marsh, in Suffolk, and not rarely on flowers of *Angelica sylvestris* in Matley Bog, in the New Forest, where *A. fasciata* is then abundant; I have found the latter also at Bentley Woods, and first took it at Helpston Heath, near Peterborough, in August, 1889. *Arge* seems to be an uncommon genus; I have only met with *A. ustulata* in Suffolk and *A. cærulescens* in the New Forest in any quantity. Even *A. cyanocrocea* has occurred to me but twice—in 1894, and on *Chærophyllym* flower early in June, 1904; while a single *A. fuscipes* was beaten from birch bushes in Assington Thicks, in Suffolk, in the middle of May, 1902. *A. rosæ* was not met with till the end of August, 1905, when I found many larvæ feeding

on cultivated rose in the garden of Tuddenham Hall, which produced imagines from semi-transparent, pale yellow, ovate cocoons during the following spring. *Lophyrus* (probably) *pini* is said to have been found on pine at Easton, in Suffolk, but I have never seen it here. Miss Chawner has, however, kindly given me both sexes from the New Forest, and I have also received its flesh-coloured cocoon for identification from Ushaw Moor, near Durham (it was mistaken for that of a moth!).

Following Mr. Morice's nomenclature, the Nematides is the first subfamily of the restricted Tenthredinidæ, and many of its species are very abundant. *Cladius pectinicornis* is by no means uncommon here from the middle of May to the end of September, when Mr. W. H. Tuck has taken it plentifully about Bury St. Edmunds, but in the Isle of Wight, where it is even commoner, it is abroad quite by the beginning of May. Imagines of *Trichiocampus viminalis* have never occurred to me in the field, but their cocoons, composed of gnawed particles of wood and enclosing a transparent pale brown inner layer, are common beneath willow-bark during the winter; from three such, found on March 3rd (and still containing larvæ), on the under side of a piece of fallen bark at Tattingstone, in Suffolk, there emerged a pair between the 6th and 18th of the following June, and a female on July 14th. From a similar though much flatter cocoon (its shape is doubtless largely regulated by the "elbow-room" at its grub's disposal), composed by a "larva beaten from oak" on October 20th, 1894, there emerged a female of this species—which invariably feeds on willow—on 28th of the following June! *T. ulmi* has only occurred to me singly at Leiston, Tuddenham, Lowestoft, and Monks Soham; while a single *T. drewseni* was found in a greenhouse at Ryde, Isle of Wight, on August 11th, 1902. *Priophorus padi* is one of our commonest species, and may be swept from herbage everywhere from the end of May to that of September; I have it from Hants, Norfolk, and all parts of Suffolk; but *P. tristis* is much rarer, and I have only two specimens, both taken early in 1895 at Bramford, near Ipswich, and the Bentley Woods, by sweeping.

Both species of *Hemichroa* are handsome insects, and neither is common; *H. alni* has occurred to me on birch in the Bentley Woods on May 25th; in a marsh at Rookley, in the Isle of Wight, at the end of June; and on flowers of *Angelica sylvestris* among alders at Lackford Bridge, Suffolk, on August 26th. *H. crocea* is not more abundant at Brandon on June 9th, 1903, and by sweeping in a wood at Freston, near Ipswich, on July 22nd, 1904. At Matley Bog, in the New Forest, on June 13th, 1907, I took a single female *Leptocercus luridiventris*. *Dineura nigricans* is one of the commonest and prettiest sawflies of the Bentley Woods and Assington Thicks in May and June, when it is

frequently beaten from birch-bushes; but *D. stilata* is certainly rarer, since I have only swept it during the first half of June from hazel, &c., at Monks Soham, Brandon, and Wroxham Broad. Nor is the little *Micronematus monogyniæ* more plentiful in the Bentley Woods and Matley Bog from the middle of May to that of June; and only one *Cryptocampus*, which Mr. Morice thinks is *C. saliceti*, has occurred to me at Barton Mills, Bentley Woods, and Needham in Suffolk, and Calbourne in the Isle of Wight, in May and June. Both *Cræsus septentrionalis* and *C. varus* were not uncommon among alder at Matley Bog in August, 1901, and the former is found at Brandon during the same month. Stephens (Illus. vii. 39) records it somewhat doubtfully from Bungay, apparently on Curtis's authority, and Westwood exhibited a specimen "one of the hind legs of which, although perfect, was considerably smaller than the other. From the collection of Rev. W. Kirby, F.R.S." (Proc. Ent. Soc. 1840, p. v.). In August, 1898, I found a lot of larvæ near Lowestoft, which Mr. Bloomfield thought referable to this species; *C. latipes* appears to be rarer, and I have only one, found at Oxshott by Beamont, May 25th, 1901. *Pontania bipartita* is represented in my collection by a single pair, swept in the salt-marshes at Walberswick and Dunwich, on the Suffolk coast, at the end of May, 1905; but *P. leucosticta* is sometimes in the utmost profusion on willow trees both in Suffolk and the New Forest often as early as April 24th. *P. viminalis* is also very common, especially in marshes about Southwold, in June and July, and from an old willow-stump I had brought indoors here on 10th of last April a female had emerged, and was sitting on the bare wood at 11 a.m. on May 21st; *P. salicis* and *P. proxima* are common in similar situations in May and June, the latter extending to the first week in August.

The British Nemati, as now restricted, consist of but four, or perhaps five, species, concerning whose appearance there seems to be something peculiar, since I have taken both sexes of *N. abdominalis* upon but one occasion in the Norfolk Broads; two *N. acuminatus* on only May 29th, 1902, in the oft-worked Bentley Woods by beating birch; and three *N. luteus* together on June 7th, 1903, on oft-beaten alders at Brandon. *Pteronus* is a long genus of twenty-three species, of which I find only fourteen represented; the first, *P. salicis*, is very common on osiers, and I watched a female laying her eggs in a leaf of this tree on June 18th, 1903—three or four are inserted in very oblique rows on either side of the midrib in the apical half only. *P. ribesii* has very uncommonly turned up, though of course abundant in every garden. There is a capital account of it in one of the old Entomological Magazines. In 1893 I took a single *Nematus consobrinus*, Cam. (female), which Morice doubtfully synonymises with *P. leucotrochus*, Htg., and in May and June,

1895, a single pair of *P. pavidus* was beaten from birch in the Bentley Woods. *P. myosotidis* is very common in May and August; it has turned up at Lavenham, Oulton Broad, Barnby Broad, and Ipswich in Suffolk, and about Lyndhurst in Hants; but *P. hortensis* appears to be rare—at all events, I have only one female, which was beaten from low bushes in Bentley Woods in the middle of June, 1896. *P. virescens* occurs in the same locality, as well as at Barton Mills and Tuddenham Fen, sometimes as early as April 26th, the latest date of capture being August 28th; it is probably common. At Henstead in August, Bentley in May, and at Merston in Isle of Wight in June, I have found a species referred with comparative certainty to *P. melanaspis*; and *P. curtispinis* has turned up at Tuddenham Fen in June, Bentley Woods on birch in early May, and on very late *Heracleum* flowers on the cliffs at Southwold on September 4th, 1907. *P. oligospilus* is probably common, though I have only met with three females at Brandon, Tuddenham, and on the banks of the Orwell at Ipswich, by beating willow-bushes, and along with it at the first town is found *P. polyspilus*, not infrequently in the middle of August. Only one *P. brevipennis* has fallen to my lot; she was beaten from an alder at Foxhall, near Ipswich, on September 10th, 1904, and *P. bergmanni* has not been seen there since 1894. The handsome *P. miliaris*, Panz., was taken at Ipswich during the same season, and a second specimen bred from a somewhat irregularly shaped, dull, smooth, jet-black cocoon found by Mr. G. W. Clutton at Burnley; when I received it on August 23rd, 1899, the imago had entirely removed its operculum, but would not emerge, though quite perfect, without assistance.

(To be continued.)

THE ATHALIA GROUP OF THE GENUS MELITÆA.

BY GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 142.)

WE come now to the smallest and one of the most interesting of the group, probably the most ancestral of the whole genus—older, I think, than *varia*, older even than *merope*—the high-mountain species, *asteria*. This was first named by Freyer in 1828, the year in which his first volume was published. He illustrates it quite unmistakably, and writes one of his little square pages about it, but does not give anything that lends itself to quotation by way of a description. He says it is only half the size of *dyctinna* (*sic*)—a name he attributes to Ochsen-

heimer—or of *athalia*, or of “*corythalia*”; that it approaches nearer to the first on the upper side and to the second on the under side, and gives as the best distinctive mark the absence of the inner edging line of the border, of course—though he does not say so—on the under side. There has never been any doubt as to the identity of this species, and the under side always serves for the determination of specimens, though the inner edging line is occasionally indicated, and the upper side is sometimes astonishingly close to *merope*. It has also escaped synonyms, except that Herrich-Schäffer spells the name *asterie*. With regard to its ancestral position more must be said later.

Britomartis, which is usually, and I have no doubt wrongly, given as a variety of *aurelia*, was in point of fact described and separated from *athalia* before what is now regarded as its type-form. It was first named and described in the first number of the Breslau ‘*Zeitschrift für Entomologie*,’ p. 2 (1847), by Assmann, the first editor of the magazine. His description runs as follows:—“*Melitæa alis integris,* ferrugineis nigro-reticulatis; posticis subtus flavidis, fasciis tribus cinnamoneis, maculisque duabus subalbicanibus, linea nigra ante marginem exteriorem flavum vel cinnamoneum.*” He then proceeds to give a more detailed description, in which he says that the ground colour is generally rather darker than *athalia* on the upper side, and that the nervures and bands are more or less suffused, in particular the basal half of the hind wing shows only the one light spot of the ground colour. The same darker ground colour obtains on the under side of the fore wing, but there is often a second row of lighter spots (*i. e.* nearer the base than the lunules) as in *dictynna*. The black spots are also larger. The most distinctive marks are, he says, afforded by the under side hind wing, as in the other species. The lighter bands (which he treats as the ground colour) are light yellow, the darker vary from a very

* Assmann very properly objected to the expression “*alis dentatis*,” used in previous descriptions of *Melitæas*; even Borkhausen’s “*subdentatis*” was only a partial correction. Principally from this point of view he gives the following amended definitions of the related species (*aurelia* not having at that time been described):—

“*M. parthenie*. *Melitæa alis integris subferrugineis fusco reticulatis; posticis subtus flavidis; fasciis tribus cinnamoneis unaque albidula; linea nigra ante marginem exteriorem ferrugineum.*

“*M. dictynna*. *Melitæa alis integris saturate ferrugineis nigro reticulatis; posticis subtus flavis; fasciis tribus badiis, tertia nigropunctata; linea nigra ante marginem exteriorem badium.*

“*M. athalia*. *Melitæa alis integris ferrugineis nigro reticulatis; posticis subtus flavidis; margine exteriore concolore post lineam nigram; fasciis tribus fulvis.*

“*M. asteria*. *Melitæa alis integris sordide ferrugineis, fusco reticulatis; posticis subtus flavidis; fasciis duabus cinnamoneis; absque linea nigra ante marginem exteriorem flavidum.*”

This last is the first regular description of *asteria*, though it is merely a condensation of Freyer’s more diffuse account of the species.

dark yellow to a cinnamon or even chestnut-brown. The outer one is lighter in the part towards the costa, and in the lower part has the black spots which we are accustomed to associate with *dictynna*, or at any rate traces of them. In the outer band of this wing the border is always darker than the lunules; the lowest spot of each of the other two light bands, which are often joined together by a narrow yellow line, he describes as being lighter than the others, and with a certain glassy appearance. This, however, he afterwards found not to be characteristic or constant (Breslau, 'Zeitschrift,' No. 15, p. 39, 1850). He treats the triangular spot at the anal angle as belonging to the outer dark band instead of the lunular light one, and remarks on its being light, instead of calling attention to the fact, mentioned incidentally, that the apex is often filled in with brown. He describes the size as being between *athalia* and *parthenie*. Its locality was Klarenkrans Wood, about three miles east of Breslau; as he speaks of taking it on a "flowery common," he apparently uses "Wald" rather to mean a forest or wooded district than what we mean by a "wood." The latter half of June was the time of capture, the males appearing first; in a fortnight's time only females could be found. A more helpful indication of time is given in his statement that it appears about eight days before *athalia*. He adds that it does not seem to care for settling on the moist spots of the road like the latter.

I have considered it necessary to enter thus fully into Assmann's description, as this species seems to be so absolutely unknown and confused with all sorts of other species and varieties. The only other authentic descriptions are by Rühl—one in the 'Societas Entomologica,' fifth year, No. 14, p. 106, and the other in his 'Palæarctic Butterflies.' The former is the more important and interesting. In it he regrets the inadequacy of the material from which he had to make his description, but such as it was it was invaluable. There was in Frey's collection a specimen purporting to be *britomartis*, which, however, the owner would not allow him to examine; but in Zeller's was one, placed unreservedly at his disposal, which was sent to Zeller by Assmann himself, and from this, and two in his own possession which he compared with it, his description was drawn up. Now of course the important question to-day is, What did Assmann mean to describe? and therefore, Where can any of his specimens be seen? Both Zeller's and Frey's collections passed into the hands of the British Museum authorities, and therefore are naturally to be looked for in the Natural History Museum at South Kensington; but alas! they have long ago been broken up, and their contents scattered about amongst the remnants of other collections equally disintegrated, in order to make one general collection.

I am assured that it would have been impossible to keep these great historic collections separate and entire, and while my whole entomological soul cries out against their absorption into this Nirvana, where all their individuality is lost, I realize that it is too late for any remedy to be possible. Even granting the necessity for their disruption, and gratefully admitting that the original labels are never removed, one might still have hoped that no specimen would be omitted from the general collection which might possibly have any special historic interest or value, and that to those, whether excluded or included, whose correct place was doubtful (as in the case, for example, of unusual aberrations), an extra label might have been attached, stating under what species the previous owner had placed it. Whilst regretting that neither of these hopes is justified by facts, I must emphatically repudiate any suggestion that I am casting any reflection whatever on the present Curator of the Rhopalocera, whose kindness to me during my long hours of work at the Museum has been unfailing, and who, I know, regrets these omissions, for which he is no way responsible, as much as I do. Frey's specimen, which is not *britomartis* at all according to Assmann's description, was in the general collection, but Zeller's I could not find. Mr. Heron, however, kindly produced the drawers of excluded specimens, and there I instantly found it, so that this, in all probability the only co-type of the species to be found in England (or, for aught I know, elsewhere), is now restored to a place in the general collection, with the outlines of its history attached to it, as well as Zeller's own label, and its date and locality (Klarenkranst) pencilled probably by Assmann himself. The specimen is unfortunately a female, and therefore, as is usual in this group, less definitely marked than the average male would be; still, it serves as a standard of comparison, and cannot, in my opinion, be included, in the face of Assmann's and Ruhl's descriptions, either under the head of *aurelia* or of *dictynna*.

In the latter part of July, 1904, I was hunting at Reazzino, between Bellinzona and Locarno, for *Heteropterus morpheus*, in consequence of Mr. Fison's re-discovery of that insect in this locality the previous year (after a lapse of nearly fifty years since it had been recorded in Switzerland), when on the 25th of the month I came across a *Melitea* flying in some numbers in the marshy ground just beyond the quarries, which differed from any others with which I had a personal acquaintance. Most of the specimens were very small, ranging from the size of the *aurelia* of the Rhone Valley to that of *asteria*; the under sides resembled *dictynna*, but were more heavily marked on the fore wing; the upper sides varied greatly, some approaching *aurelia*, others *athalia*, whilst two specimens, a male and a female, were not more heavily marked than *parthenie*. At the

same time I took one specimen of *dictynna*, rather lighter than the average, and slightly smaller in size, but considerably larger than the largest of my other captures; moreover, this specimen was quite worn out, whereas the others were very fresh. The under side precluded the possibility of any other species than *dictynna* or *britomartis*; the upper side appeared to me to put the former out of the question. July, 1906, found me again at the same spot, and again this *Melitea* appeared, a few males on the 14th, both sexes commonly on the 23rd, not only on its former ground but also on both sides of the main road. On comparing my specimens with the Silesian examples labelled *britomartis* in the Berne Museum, they appeared to be identical. At the end of June, 1907—a very late season—I again visited the spot, and found the remains of an earlier brood; a few males and a fair number of females were, however, in very passable condition. These were much larger than the specimens taken in the two former years, and mostly approached closely to *athalia* on the upper side, the under side again being close to *dictynna*, and presenting the black spots in the outer dark band which we usually regard as characteristic of the latter species. Unfortunately all the females which I kept with a view to eggs failed to oblige, and in fact proved to have laid all their eggs already; whilst others of the later brood which I had kept the previous year refused to lay in captivity, probably because I had not hit upon their proper food-plant, though I provided them with scabious and plantain, on the latter of which *aurelia* lays freely. Eggs which I obtained by dissection after the death of these second-brood specimens were unfortunately so shrivelled by the time they arrived in England that even Mr. Tonge was unable to produce very intelligible photographs of them.

Judging from the imago, I feel sure that the Reazzino specimens are, as I originally supposed, *britomartis*, the only alternatives being that they are a form of *dictynna* or a new species. The upper sides and certain other peculiarities appear to me to preclude the former, and there is as yet no reason to imagine the latter. They are certainly much closer to Assmann's specimens than to any other species. One very general, though not absolutely constant, peculiarity is the somewhat conspicuous angulation of the fore wing about a third of the way down the outer margin; this is very conspicuous in Assmann's example. Another objection to the *dictynna* theory is the fact that the Reazzino *Melitea* is undoubtedly double-brooded. This is not the case with *dictynna* even much further south. It may of course be urged that Assmann only mentions one brood of *britomartis*, but this is north instead of south of the Alps, and he never suggests that he had even looked for a second brood; his mention of its appearance being earlier than that of *athalia* points at any rate to the possibility of a second brood, and his

date is scarcely later than that of the first brood at Reazzino. It may also be urged that Rühl speaks of *dictynna* as being double-brooded at Salzburg, but from what we know of this species elsewhere it is far more probable that the Salzburg insect is *britomartis* than that there is really a second brood of *dictynna* at so northern a point. Furthermore, even the lightest form of *dictynna* from the eastern Pyrenees (var. *vernetensis*, Oberthür) is still unmistakably *dictynna*, and would hardly be liable to be taken for *britomartis*. In subsequent observations on the distinctive marks of this species I shall on these grounds include the Reazzino specimens under this head.

(To be continued.)

NOTES AND OBSERVATIONS.

THE LONG LIFE OF *SCOLIOPTERYX LIBATRIX*.—In answer to the Rev. F. E. Lowe, a specimen of *S. libatrix* came to sugar on June 10th, 1908, near Peterborough. The colouring was rather dull, though it was otherwise in good condition.—C. L. HEBERDEN; 72, Adam's Avenue, Northampton, June 12th, 1908.

Your correspondent, Rev. F. E. Lowe, would probably be interested to hear that there were about a dozen specimens of this insect on my sugar-patches on June 1st of this year. One or two of them seemed in excellent condition.—J. S. CARTER; Radley College, Abingdon, June 16th, 1908.

With reference to the query this month regarding *Scoliopteryx libatrix*, it may interest your correspondent to know that I saw some half-dozen specimens of this insect at sugar on June 2nd this year near Hailsham, in Sussex. Beyond the natural fading of colours they were not by any means in bad condition. I see Barrett says, "After hybernation till May."—P. A. CARDEW (Capt. R.A.); St. Aldwyn's, Park Avenue, Dover, June 18th, 1908.

GYNANDROUS SPECIMEN OF *BUPALUS PINIARIA*.—While collecting at Oxshott yesterday afternoon, I had the good fortune to secure a gynandrous specimen of *B. piniaria* in very good condition. The left side is female, and the right male. The right hind wing is somewhat crumpled, and the left very slightly rubbed; otherwise, except that three legs are missing, it is practically perfect.—HAROLD B. WILLIAMS; 82, Filey Avenue, Stoke Newington, N., June 7th, 1908.

TERATOLOGICAL SPECIMEN OF *MELITÆA AURINIA* (ARTEMIS).—On June 5th, from Kent pupæ, I bred a specimen of *M. aurinia* with three wings, the right hind wing being absent. The specimen, an average-sized male, is otherwise quite perfect.—BERT. S. STONELL; 25, Studley Road, London, S.W.

ON REARING *MELITÆA AURINIA* (ARTEMIS).—During the past five years I have received from correspondents in Dover, Ireland, and Devon large numbers of the larvæ of this insect. Each year they

have taken readily to the honeysuckle I substituted for their natural food-plant; practically all turned to fine healthy pupæ, and then died. In answer to my inquiries of the senders as to their success with the larvæ, some find them easy to rear, and others experience difficulties in getting them through. Mr. Stockwell, of Dover, says he has never got many through, but a friend of his does well with them by spraying the pupæ daily. Previous to this year I have kept the larvæ in a cage with wooden top and bottom and gauze sides, and as they spin up on the ceiling of the cage, of course no sun could get at them. This season I put them in an all-gauze cage with a wooden floor, and kept them in a sunny conservatory, and each morning sprayed them with water. Not having a fine sprayer, I adopted the rough and ready method practised by seconds in the boxing-ring when their principals want refreshing, *i. e.* I took a mouthful of water and blew it through my compressed lips over them. For the encouragement of beginners in this art, I may add that a little practice enables one to produce a very fine spray, so fine that the larvæ show no sign of being disturbed. The first larva changed to pupa on May 18th, and the first butterfly emerged on June 1st. The record up to date (June 9th) is as follows. Out of about ninety-eight larvæ three died, and from the ninety-five pupæ I obtained ninety-two perfect insects, and two cripples. A few pupæ got detached and fell on the floor of the cage, but with no bad result, the imagines crawling up the sides and then expanding.—BERT. S. STONELL.

CAPTURES AND FIELD REPORTS.

ACHERONTIA ATROPOS AT OXFORD IN MAY.—I thought you might be interested to know that a specimen of *A. atropos* was taken on May 21st last at Headington Workhouse, near Oxford, by the master's wife. I heard of this yesterday afternoon, and cycled up and procured the moth, which I regret to say was rather damaged, as it had been pinned through the wings and put in a very small box. I should be interested to hear of any other report of the capture of this insect this year.—SYDNEY H. GALPIN; "Glenfield," Foxcombe Hill, near Oxford, May 29th, 1908.

PUPÆ OF LYCÆNA ARION.—Mr. Percy Richards has been good enough to send me a pupa of *L. arion*. This is one of four that he found on June 16th at Bude by searching in ant's nests under stones. "The pupæ," he writes, "appear to be carefully ensconced in earthen cells, which are possibly made by the ants, but which are of the exact size of the pupa." Three were found under one stone, and the fourth under another stone, and was the result of three hours spent in the somewhat tedious business of stone turning.—RICHARD SOUTH; 96, Drakefield Road, Upper Tooting, S.W.

COLIAS EDUSA NEAR GRAVESEND.—On June 13th, as my son and I were setting out on an entomological expedition, we saw a specimen of *Colias edusa* in a lane near the town. Unfortunately we both had

folding-nets, and though my son pursued the insect, fitting up his net as he did so, just as he was prepared to strike at it, it flew over the hedge and across a field of wheat, where of course he was unable to follow it. We were thus unable to judge of its condition. No doubt the prevalence of strong south-westerly winds lately has blown some *C. edusa* over from abroad, and if conditions continue favourable we may look for this species later.—H. HUGGINS; 13, Clarence Place, Gravesend.

PREVALENCE OF ARCTIA CAIA LARVÆ THIS YEAR.—Last season Mr. L. W. Newman remarked on the scarcity of these larvæ in Kent, and I was able to confirm his remarks as far as this district is concerned. Mr. Newman suggested that the scarcity last season was probably caused by the fact that the hot autumn of 1906 had carried the larvæ past their usual stadium, and the majority had died during the winter in consequence. I do not think that this theory is correct, for last autumn was quite as hot as that of 1906, and this season *A. caia* larvæ have been quite as plentiful as they ever were about here.—H. HUGGINS.

NOTE ON METOPSILUS (CHÆROCAMPA) PORCELLUS.—From the 17th till the 21st of June, *Chærocampa porcellus* has been hovering over and feeding from delphiniums in the garden here, and of them I took three specimens. As I have not heard before of *porcellus* visiting these flowers, I thought the capture worth recording.—D. C. HOLMES; The Briars, Manor Road, Thames Ditton, June 26th, 1908.

RECENT LITERATURE.

Proceedings of the South London Entomological and Natural History Society, 1907-8. With Five Plates. Pp. i-xvi, 1-114. The Society's Rooms, Hibernia Chambers, London Bridge.

From the "Report of the Council," which by the way is the Thirty-sixth, we learn that the present membership of this flourishing Society totals 166. That excellent work is being done by the members, in the various departments of natural history study and research, the literary contents of the publication present convincing evidence. Among the papers are—"Our Authorities: an Introduction to the Early Literature of Entomology," by Hy. J. Turner, F.E.S.; "Rhopalocera of the Taunus Hills," by Alfred Sieh, F.E.S.; "Notes on *Porthesia chrysorrhæa*" and "Further Notes on *Tortrix pronubana*," by R. Adkin, F.E.S. In the President's Address there is considerable reference to local Natural History Societies, their objects, &c.; also interesting remarks on the advantages of associating local societies in the form of a federation or union.

Three of the plates illustrate the life-history of *Tortrix pronubana*, largely reproductions of photographs by Mr. A. E. Tonge; two others show photos of the larvæ and pupæ of *Charaxes jasius*, by Mr. H. Main.



W J Lucas ad nat phot 1

2 West Newman proc

1. *LEUCOPHÆA SURINAMENSIS*, Linn. from Kew Gardens (nat size)
- 2 *DECTICUS VERRUCIVORUS*, Linn , ♀ ($\frac{2}{3}$ nat. size).

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[No. 543

DESCRIPTION OF A NEW FORM OF *ZYGÆNA* FROM ALGERIA.

BY THE HON. WALTER ROTHSCHILD, Ph.D.

Zygæna lavandulæ nisseni, subspec. nov.

I HAVE much pleasure in naming this new form after the genial Danish Consul in Algiers, Dr. Nissen, who first suggested our visit to Hammam R'Irha.

Differs from *Z. lavandulæ lavandulæ* at first sight by the much broader and rounder fore wing, and by the total absence of any red on the upper side of the hind wing. The metallic gloss of the fore wing above in the male has much less blue, and in the female appears more silky. *Z. l. nisseni* also differs strongly from *Z. l. lavandulæ* in the spots on the upper side of the fore wing. The two basal spots are much larger, the discal spot nearest the costa is as large or larger, while the lower discal spot is reduced to a black dot with a tiny red centre in most specimens, but entirely black in some. The apical spot is enlarged to quite double the size of that in the nymotypical form, and is concave on its inner side. On the under side the fore wings have the base largely red, but the lower discal spot is entirely absent; the hind wings in most cases have a basal red streak along the costa, and a minute red dot towards the apex, though in one male the red is absent below as well as above.

Hab. Hammam R'Irha, North Algeria.

This fine new form was discovered by Dr. Karl Jordan on May 26th of this year, numerous specimens sitting on thistle-blooms along the edge of a wood.

ORTHOPTERA IN 1907.

By W. J. LUCAS, B.A., F.E.S.

(PLATE VI.)

LOOKED at from the point of view of the student of the British Orthoptera, 1907 presented few features of special importance, though matters of minor interest were not altogether absent. The weather, at any rate in the South of England, seemed not to affect adversely this order of insects in the same way as it did the Lepidoptera.

FORFICULODEA.—*Labia minor*, though considered a common insect, does not, in my own experience, make itself at all conspicuous. I met with but one, a female, seen on the wing in Surbiton Station on July 14th, and caught on an umbrella. While it was moving the pale joints at the tip of the antennæ were very noticeable, though perhaps the black background of the umbrella made them more conspicuous than they would otherwise have been. Mr. E. J. B. Sopp tells me he found it flying over manure on Rusthall Common, Tunbridge Wells, on April 1st, and that he met with it at Broadstairs (June) and Eastbourne (September). On August 1st I sought for and found *Labidura riparia* near Christchurch, in Hants. Males and females were present, though but two of the former were taken. Of several immature specimens found one was very small. The developing wings, when examined with a lens, are interesting objects of observation in the nymphs. From Mr. Burr I received in the autumn *Forficula lesnei* from Folkestone, and also, which is much more interesting, *Apterygida media (albipennis)*, taken September 24th, a few miles from Dover. This, following the late Mr. Chitty's rediscovery of the species in another part of Kent, is most satisfactory.

BLATTODEA.—On August 24th an *Ectobia lapponica* was captured in the New Forest on vegetation close to the ground, and on August 8th *Ectobia panzeri* was taken on a pathway in the New Forest. This latter species seems to be well distributed over the southern parts of the Forest at least, although perhaps it is usually a coast insect with us. Mr. E. C. Bedwell gave me two specimens of *Ectobia livida* taken at Boxhill, Surrey, on August 11th (and one from Mickleham Downs, taken on August 19th of the previous year). Mr. E. J. B. Sopp reports *Phyllodromia germanica* from Dover, Ramsgate, and Hastings, and Mr. W. Daws tells me of his having found *Blatta orientalis* in a garden on March 29th (*vide* Entom. xl. 110). On May 22nd, in the so-called insect-house at the Zoological Gardens, *Periplaneta americana* was quite at home in a wild state, and apparently its presence there was well-known to the sparrows, for while we

at Brandon at the end of August, 1905, where also, as well as at Winterton in Norfolk, I have swept *Eriocampoides annulipes* in June. *E. variipes*, Klug, is not uncommon in June and July at Walberswick, and in the Bentley Woods. The two interesting species, *E. ethiops* and *E. limacina*, are not at all common with us; the former was, however, not rare on May 31st, 1900, examining the leaves of *Rosa canina* in the Bawdsey Marshes, near Felixstowe, and I noticed several on those of cultivated roses in the garden of our lodgings in Wicken early in June, 1902. Of the latter, I have given some account in the first volume of 'The Countryside' from a number of cherry-tree leaves sent me, from which this "slugworm" had quite devoured the epidermis; it rarely turns up in the Suffolk Bentley Woods and the Kent Blean Woods, though essentially a garden insect. *Hoplocampa pectoralis* and *H. rutilicornis* must, I think, be rare, since I have found but one of each, the former in a very marshy place among osiers at Barton Mills on June 12th, 1889, and the latter (female) on some bushes in Dodnash Woods, near Ipswich, on April 27th, 1897. But both *H. crategi* and *H. ferruginea* are abundant in hedges throughout the spring, and in June, 1899, I bred one of the former, referred by Mr. Morice to the doubtfully distinct form *H. alpina*, Thoms., which I am strongly of the opinion (though my notes fail me) emerged from a gall of *Cynips kollari*, where it had perhaps hibernated.

Several of the Blennocampides are among our commonest sawflies, and all have a particularly *svelte* appearance, claiming particular attention in the net. *Mesoneura opaca* (*Dineura verna*, olim) appears pretty regularly in the Bentley Woods about May 20th, but I have not seen *Phymatoceros aterrima* there since 1894; and both sexes of *Pareophora nigripes* are rare at the same time of year at Foxhall and Lavenham, in Suffolk. All my *Periclista melanocephala* were taken at Bentley or Assington in woods in May, except one pair, which the late Mr. J. W. Cross sent me during the same month from Brockenhurst, in the New Forest, where, in Matley Bog, I found *Ardis sulcata* not rarely in the middle of last June. *Tomostethus fuliginosus* is common throughout Suffolk and in the Isle of Wight from the end of May to that of August, usually by sweeping low herbage, and both *T. dubius* and *T. luteiventris* are among the commonest British species, being constantly swept from low herbage in damp situations; the former I have from Norfolk, Suffolk, and Cambridgeshire, while its black-thoraced variety *nigrans*, Knw., was very abundant in Matley Bog, among alders, last June, and with it occurred the latter species in the greatest profusion, as, indeed, it also does in Suffolk, Norfolk, and the Isle of Wight. Of the genus *Blennocampa*, as now restricted to six species, none can be called really common, though *B. pusilla* and *B. alternipes* are perhaps most frequently met with, the former in May and

June in Assington Thicks and the Isle of Wight, as well as at Bungay, where Mr. Tuck has captured it; the latter extends to August, and has occurred to me on the banks of the Gipping above Ipswich in two or three places, and in the New Forest. *B. tenuicornis* I have only found at the beginning of June at Barton Mills, and twice at Foxhall, in the marshes by sweeping reeds, &c.; and *B. assimilis* is found in both East and West Suffolk quite by the beginning of May by general sweeping. I have all but three of the remaining species of this subfamily, which is strange, since most of them are but singly represented, and they must all be uncommon. *Scolioneura nana* occurs in the Bentley Woods in May and June, where it is accompanied in the former month by *S. betuleti*; but *S. vicina* has only once been found at Dodnash Woods, and then on September 16th. The single *Entodectus pumila* I have seen is a female swept in Rookley Wilderness, in the Isle of Wight, on June 27th, 1907, but *Monophadnus albipes* is not uncommon from April to June in Norfolk and Suffolk; where *M. geniculatus* has sparingly turned up in the Bentley Woods, and at Brockenhurst and Wilverley, in the New Forest, in May and June. My only *Kaliosphinga ulmi* was swept at the end of last May in a lane at Foxhall, and I have but twice met with *K. melanopoda*, once in Barnby Broad (cf. Ent. Mo. Mag. 1899, p. 209), and once at Diss, in Norfolk, in June. My single *Fenusa pygmæa* was taken during my "Day in Kirby's Country," June 10th, 1897 (cf. Ent. Mo. Mag. 1897, p. 265), and my only *F. nigricans* swept in a very boggy spot, among osiers, at Barton Mills, on June 12th, 1899. Of *Fenella nigrita* I also have but one example, which was taken by quite casual sweeping along the roadside where I have frequently swept before, and since at Belstead, in Suffolk, on May 29th, 1902.

The next subfamily is the Selandriades.

(To be continued.)

ON SOME BORNEAN SPECIES OF *TRIGONA* (APIDÆ).

By P. CAMERON.

THE species of *Trigona* I have in my collection from Sarawak, Borneo, may be separated by means of the following table:—

- 1 (6). Entirely black species.
- 2 (3). Base of wings blackish, the apex with
white *collina*, Sm.
- 3 (2). Wings hyaline.
- 4 (5). Apex of clypeus, mandibles, antennal
scape, and tarsi black *canifrons*, Sm.

- 5 (4). Apex of clypeus, mandibles, antennal scape testaceous, apical joints of tarsi rufous *erythrostoma*, Cam.
- 6 (1). Body not all black.
- 7 (17). Head black.
- 8 (14). Thorax black.
- 9 (12). Abdomen dark rufous.
- 10 (11). Thorax densely covered with fulvous pubescence; base of cubitus straight, oblique *fulvopilosella*, Cam.
- 11 (10). Thorax covered sparsely with short black pubescence; the base of cubitus roundly curved *erythrogaster*, Cam.
- 12 (13). Abdomen black in the middle, the base and apex pale yellow; the femora testaceous *latibalteata*, Cam.
- 13 (12). Abdomen pallid yellow, with pale fuscous bands, legs black *fusco-balteata*, Cam.
- 14 (8). Thorax testaceous.
- 15 (16). Apex of wings lacteous, legs for the greater part black; the thorax densely covered with fulvous pubescence *lacteifasciata*, Cam.
- 16 (15). Wings clear hyaline, legs testaceous, thorax with pale pubescence *testaceinerva*, Cam.
- 17 (7). Head testaceous.
- 18 (19). Large; hind tibiæ and tarsi black; wings yellow in front; stigma yellow *flavistigma*, Cam.
- 19 (18). Small; legs pale yellow; stigma pale *pallidistigma*, Cam.

Trigona erythrostoma, sp. nov.

Black; the apex of clypeus, the apex of mandibles broadly, and the apical four joints of the tarsi rufous; wings hyaline, slightly suffused with fuscous, the nervures and stigma black; the sides of front, apex of mesonotum, scutellum, mesopleuræ, mesosternum, metapleuræ, and the metanotum covered with white pubescence; the rest of the head, thorax, and abdomen with longer, stiffer black pubescence; the pubescence on the coxæ and trochanters white, on the femora and tibiæ black, on the tarsi white mixed with black; the four front trochanters and the basal joint of the anterior tarsi are rufous; the fore spurs of a paler rufous colour. Tegulæ black. ♂ or ♀. Length, 4 mm.

Kuching, Borneo (John Hewitt).

Smooth and shining. Basal abscissa of cubitus very little bent or angled; beyond the recurrent nervure (which is also very faint) it is almost obliterated. The scutellum rises obliquely from the base to the apex; the apical slope is oblique, projecting at the top over the lower part. The hind tibiæ become gradually dilated from the base to the apex. The under side of the antennal flagellum is brownish. The stump of the cubitus issues from the middle of the cubital abscissa.

Allied to *T. canifrons*, Sm., which is a larger species, and has the oral region, mandibles, and tarsi black.

Trigona fulvopilosella, sp. nov.

Black; the extreme base of antennal scape, the coxæ, trochanters, the greater part of the four anterior femora, the base of the posterior, tegulæ, and the abdomen, brownish red; the apical abdominal segments more or less black, the thorax densely covered with fulvous pubescence; wings hyaline, distinctly tinged with fulvous, the nervures and stigma pale fulvous, the posterior nervures paler than the anterior. ♀. Length, 7 mm.

Kuching, May and October (John Hewitt).

The centre of the mesonotum and metanotum are bare of pubescence, probably, however, through the hair having been rubbed off. The hair on the legs is black and stiff. The head has a white sericeous pile. The stump of the transverse cubital nervure is placed shortly below the middle of the first abscissa of the cubitus; the recurrent nervure is reaping-hook-shaped, *i. e.* the anterior half is roundly curved towards the apex of the wing, the posterior part being straight and oblique. The base of the hind tibiæ is distinctly narrowed, the latter not becoming gradually widened from the base towards the apex; the apical joint of the tarsi and the claws are rufo-testaceous.

This species comes nearest to *T. erythrogaster*, Cam.; the latter may be known from it by the thorax not being covered with fulvous pubescence, by the hind tibiæ becoming gradually narrowed from the base to the apex, the base not being distinctly narrowed, by the stump of the recurrent nervure being received above the middle of the basal abscissa of the cubitus, and by the recurrent nervure not being hook-shaped but straight.

Trigona fusco-balteata, sp. nov.

Black, smooth, shining; the antennal scape, apex of clypeus, labrum, mandibles, except at base, and more or less of the coxæ and trochanters, rufo-testaceous; the under side of flagellum of a darker rufous colour; abdomen pallid testaceous, the base of the segments broadly banded with fuscous; wings hyaline, the nervures and stigma dark testaceous; the basal abscissa of cubitus straight, oblique, unbroken. The head anteriorly from the lower half of the front densely covered with depressed white pubescence; the thorax with longer white pubescence, which is longer and denser on the pleuræ and sternum, especially on the latter; the sides and apex of the scutellum are fringed above with long pale hair. ♂. Length, 3 mm.

Medang, Sarawak (Hewitt).

The knees and apex of tibiæ may be testaceous, as may be also the base of the legs. The pubescence on the mesonotum is thicker round the edges, and it may appear as longitudinal stripes down the centre. The fuscous bands on the back of the abdomen are more distinct—darker—in some specimens than in others.

Trigona testaceinerva, sp. nov.

Rufo-testaceous; the head black, except the clypeus, labrum, centre of face broadly, and a triangular mark (the narrowed end above) between and above the antennæ; the base of mesonotum suffused with fuscous; wings clear hyaline, the stigma and nervures testaceous; the basal abscissa of cubitus straight, oblique, broken by the stump of the recurrent nervure shortly below the middle; the cubitus obliterated beyond the recurrent nervure. Antennal scape rufo-testaceous; the under side of the flagellum of a darker rufo-testaceous colour. The pubescence on the mesonotum and top of scutellum fuscous, on the rest of the thorax it is denser and white; the hair on the legs white. ♀. Length, 4 mm.

Kuching, Borneo (John Hewitt). A broad, ovate species.

Trigona pallidistigma, sp. nov.

Testaceous; the head above the antennæ and the occiput fuscous, the face and clypeus paler, the front more rufous in tint; the legs pallid yellow; the scape of antennæ rufo-testaceous, the flagellum black; wings hyaline, iridescent, the stigma and nervures pale testaceous. ♂. Length, 3 mm.

Sarawak, Borneo (R. Shelford).

Smooth and shining; the hair on the head, body, and legs short and white. The hind tibiæ become gradually widened from the base to the apex, which is roundly curved; the top closely fringed with white hair. Hinder metatarsus wide, becoming gradually but not very much wider towards the apex, which is rounded.

Is allied to *T. fusco-balteata*, Cam., which may be known by the black head and legs, and by the fuscous bands on the abdomen.

THE ATHALIA GROUP OF THE GENUS MELITÆA.

By GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 182.)

*Aurelia** was first definitely separated from *athalia*, and the name given, by Nickerl in his 'Synopsis der Lepidopteren-fauna Böhmens,' published in 1850. He does not, however, give any concise description of it, but contents himself with mentioning

* My argument that we apply the name *athalia* correctly is in no way influenced by Mr. Rowland-Brown's criticism that *aurelia* is found at Fontainebleau and Lardy, since Geoffroy distinctly asserts in his preface that he confines his remarks to insects taken within a walk of two or three leagues of Paris, and in this sense of the word neighbourhood *aurelia* is, as I contended, absent from the neighbourhood of Paris. I may here also remark in passing that the paragraph on *dictynna* should obviously have preceded that on *parthenie*.

fortiter nigre cincto." He further draws attention, in a short German comment on this description, to the depth of the ground colour, the elongated wings, the characteristic broad border of the hind wing nearly filling up the lunules, the strongly-marked fore wing on the under side, and the brightness and broad black border of the hind wing on the under side. After all this it is not surprising that he should add that the specimens he had examined were quite different from any other *Athalias* he had ever seen. These specimens were five in number, sent to him by their captor M. de Büren, of Berne, and purported to come from Bérissal. In my 'Butterflies of Switzerland,' &c., p. 87 (1903), I made the following observation: "The name *berissalensis* is a complete misnomer, it being an open secret that the original type-specimens came from Martigny, whence their captor went direct to Bérissal, his captures from the two places becoming mixed." This information was supplied to me by my friend the late Chanoine Favre, of Martigny; and though I was perfectly satisfied of the truth of this statement, I did not at that time feel at liberty to explain the matter more fully; later I had the pleasure of making the acquaintance of M. de Büren himself, the captor, as we have seen, of the type-specimens described by Rühl, who himself definitely assured me that my observation was correct, and that his specimens had actually been taken, as I had stated, at Martigny. Is it too much to hope that this definite declaration on M. de Büren's own authority will once for all clear up the confusion which the unfortunate name has caused? I further observed that: "It has never been taken at Bérissal, and it may be safely predicted that it never will be." I ought perhaps to have given my reason for such an assertion, which is that neither of the food-plants grows at anything like such an elevation; it would probably be quite impossible to find a single plant, either of *Linaria officinalis* or *L. minor*, within 2000 ft at any rate, of Bérissal; the only *Linaria* that grows in that neighbourhood, and that principally at a considerably greater elevation, is the beautiful "dragon's-tongue," *L. alpina*, a plant found most commonly on the moraines of glaciers, and at far too great an altitude for the heat-loving *berissalensis*. In the summer of 1899 a short pamphlet was given to me by its author, Chanoine Favre, which I translated and published in the December number of the 'Entomologists' Record' for that year, vol. xi. p. 315, which was intended to be supplementary to Rühl's descriptions in the 'Societas Entomologica' and the 'Schmetterlinge,' in which Favre comes, after prolonged study of the insect in all stages, to the conclusion that it is not a variety of *athalia* but a distinct species; because it is double-brooded, the two broods appearing one before the other after the single brood of *athalia*; because it is specialized to certain food-plants, i.e., *Linaria officinalis*, on which the eggs

are invariably laid, and *L. minor*, on which the caterpillar feeds in preference after it is half grown; and because it has the following constant characters: (1) an elongated form of wing; (2) the two basal black lines on the fore wing straight and parallel; (3) the border of the hind wing upper side so broad as almost to cover the lunules; (4) the median light band of the hind wing under side very narrow and the general arrangement of that wing like that of *deione*. He then continues thus: "To these characteristics may be added the following, which are equally constant: on the under side of the fore wing, in the space corresponding with the lower portion of the median band, this species has always and invariably a black mark like a Y placed horizontally and opening outwards > thus, a mark which is not met with in any other species, not even in *deione*, which, as we have said, resembles it the most closely; this mark is also visible on the upper side of the same wings. On the under side of the hind wing, between the basal and median rows of spots, is a triangular spot, whose lower acute angle rests on the last spot of the basal band, which gives a slight resemblance to *M. deione* but to no other species. Its flight also is more sustained and less jerky." While fully concurring in the two latter distinctions, especially in his observation on the triangular spot which is conspicuously characteristic, I must observe that his remarks on the Y-mark go somewhat beyond what is warranted by more recently ascertained facts. In the first place, it is by no means so invariable in *berisalensis* as is here stated, the mark often becomes an italic *x* placed sideways, especially on the upper side, and occasionally like parentheses placed horizontally and back to back thus > ; sometimes it even becomes an oblong black patch, with mere indications of the fork of the Y at the outer corners. Secondly, the mark does frequently occur in *deione*, and the elements of it are, so far as I have seen, almost always present in that species, which we now regard as the type-form of *berisalensis*. Thirdly, it is not confined even to the different forms of this species; Mr. Prideaux has a male *athalia* from Wiesbaden in which it is very distinct, and it is also frequent in *britomartis*, either as a light mark enclosed in a black patch, or more rarely as the shape of the black mark itself. Although I am treating this insect separately, I still adhere to my previously expressed opinion that it is a local race of *deione*; of this I was at one time uncertain, but a comparison with Spanish forms seems to add great weight to this probability. They mostly agree more closely with this form than with the typical French races. Those specimens which I previously ('Butterflies of Switzerland') described as being *lighter* than the French prove not to have been Spanish at all, though Pyrenean, my informant apparently having taken it for granted that the latter implied the former! One further point occurs in Chanoine Favre's

pamphlet with regard to the name *berisalii* given by Rühl. This termination should of course refer to a person not to a place, and the Chanoine's Latinity being shocked by this, he used the correct form *berisalensis*, by which name it is almost universally known. Possibly those who make a fetish of priority will wish to return to the original barbarism; for myself I shall continue to use the form I have always employed. Are the rigorists prepared to return to "*schmidtiformis*"? I was not personally acquainted with Schmidt; still I hardly think that *any* butterfly can have mimicked his shape.

In order to compare the different species of the group with one another, it is necessary to summarize the general characteristics common to them all and to adopt a common terminology. For this purpose the following may be considered as the normal characters of the whole *athalia*-group.

Ground colour fulvous or orange-brown with black nervures and other markings. A comparison with the Argynnids and Brenthids, not to mention the *didyma*-group and such species as *parthenie* and *deione*, shows the fallacy of regarding the black part as the ground colour; indeed, *dictynna* is the only species that gives any excuse for this basis of description employed by some of the early entomologists, and unfortunately adopted by Kirby. This was pointed out long ago by Assmann in the Breslau 'Zeitschrift für Entomologie,' vol. i. p. 2 (1847). Fore wing, upper side. Black border. Two black lines of varying width and conspicuousness, nearly parallel to the border; these we will call the "*outer and inner subterminal lines*." Between the border and the outer subterminal line, the ground colour shows more or less in the form of lunules, the third of which, counting upwards from the anal angle, projects further towards the disc of the wing than the others, conspicuously so except in the case of *parthenie*, where this character is slightly marked, and of *varia* and *asteria*, where it rarely exists at all; the direction and curve of the inner subterminal line is a somewhat valuable character in determining the different species. Further towards the base is a sharply elbowed, almost sickle-shaped black line of very variable breadth, curving sharply out from the costa towards the outer margin, then inwards towards the base, and again somewhat outwards, spreading out and often dividing towards the inner margin; this we will refer to as the "*elbowed line*," and to the spread-out portion as the "*marginal blotch*." Beyond the elbowed line, nearer to the base, and starting from the first nervure below the costa, is a black spot, normally only outlined and filled in with the ground colour; this we will call the "*stigma*"; this frequently joins the elbowed line at its last bend, in such a way as to make it appear to form one line with the lower part of the elbowed line. Still nearer to the base are two narrow black lines, the "*basal lines*," slightly inclining outwards from the

costa, in a generally parallel direction to each other, but nowhere actually parallel, as both are irregularly curved and the curves are not parallel. Finally, there is a dark "*basal suffusion*" of varying extent.

Upper side, hind wing. The normal markings may be regarded as a black *border*, two black lines rather broken and nearly parallel to the border, which we will call the "*outer and inner lines*," a black "*discal spot*," and often a third or "*extra line*," and a black "*basal suffusion*" containing a spot of the ground colour. When this is not surrounded by the suffusion it is outlined in black; it may be called the "*basal spot*."

The under side fore wing has an orange-brown ground colour, and may be considered as reproducing the markings of the upper side. The black border is never present, but is represented by a fine, double, dark (usually black) line. The outer subterminal line appears as an inner edging to the lunules, which are lighter than the ground colour; the inner subterminal line is usually faintly visible; the肘ed line is generally represented by three conspicuous black spots near the costa (or four if there be one on the costa itself) and a black patch on the inner margin—the marginal blotch; the outlines of the stigma and the basal lines are narrow but conspicuous, and there is a black "*basal dash*" representing the basal suffusion.

(To be continued.)

NOTES AND OBSERVATIONS.

LYCÆNA ARION IN THE COTSWOLDS. — As the result of exploration during the last two years I have been able to discover the existence of this fine species in a number of out-of-the-way spots in the Cotswold Hills, which have never been recorded in any book or periodical. Its existence in some, however, is very insecure from the extremely circumscribed extent of the area which certain of the stations embrace. In some which have been recorded in the past it is now probably extinct. One such consists of the deserted quarries on the north-east side of Painswick Hill, although it is found sparingly in one or two other places not far away. It is here, however, much harassed by the Gloucester collectors, so that it will not be long before its final extirpation takes place in the neighbourhood of Painswick. In the vicinity of Cheltenham also it is persecuted a good deal by tyros. Some of the other stations discovered by me for the species are situated on private ground, and there is reason to believe that several more may be added to the list in the more remote "combs" well off the beaten track. In only one of these it occurs in any abundance according to my experience. As a consequence of the examination of a considerable number of specimens I am able to define the following aberrations.

tions of the species in the Cotswolds, for which I propose names as follows:—

(1) *Ab. pseudo-alcon*.—Aberration of male with the wings on the upper surface unspotted, and formerly erroneously considered to be the true *alcon* of Continental Europe. Rare.

(2) *Ab. imperialis*.—Aberration of female. An exceedingly fine form, generally of a brilliant blue, with the black spots on the upper surface of the anterior wings elongated into pearl-shaped streaks, giving them the appearance of a diadem or crown. Not uncommon here. This is of frequent occurrence in the South of France.

(3) *Ab. multo-maculata*.—Aberration of male and female with the posterior wings on the upper side possessing a corresponding series of spots as on the anterior wings, though much smaller and more or less indistinct. This is almost as plentiful as the typical form, which is without them.

(4) *Ab. marginata*.—Aberration of male and female with all the wings possessing very broad black margins. Not uncommon.

(5) *Ab. cotswoldensis*.—Aberration of male and female with all the wings more or less thickly sprinkled with black scales, giving it a very dusky or melanic appearance, constituting an approach to the alpine var. *obscura* of Professor Christ. Scarce.

(6) *Ab. pallida*.—Aberration of male and female of a pale washed-out appearance. Not uncommon.

(7) *Ab. occidentalis*.—Aberration of male and female. Very dwarf undersized specimens, some not larger than *L. ægon*. Of fairly frequent occurrence.

(8) *Ab. oolitica*.—Aberration of male and female of under side exhibiting fewer spots than in the typical form, some of them coalescing. Rare.—CHAMPION LE CHAMBERLAIN; Cheltenham.

NEUROPTERA FROM THE SOUTH OF FRANCE.—In January last Dr. T. A. Chapman gave me a small collection of Neuroptera taken by him at Gavarnie from the 9th till the 30th of July, 1907, whose names appear below. Mr. K. J. Morton was good enough to assist me with the identification of some of the specimens:—

ODONATA.—*Cordulegaster annulatus*, **C. bidentatus*, **Platycnemis latipes*, *Pyrrosoma nymphula*, *Agrion mercuriale*.

PERLIDIA.—*Perla maxima*, *Chloroperla grammatica*, *Nemoura* sp., *Amphinemoura* sp. With the last three there must be unfortunately a little doubt as regards identification when males are not present.

PLANIPENNIA.—**Ascalaphus longicornis*, **A. coccajus* (a considerable number, all but one being females), **Panorpa meridionalis*, **Megalomus tortricoides*, *M. hirtus*.

TRICHOPTERA.—*Ecclisopteryx guttulata*, **Drusus monticola* (or nearly allied to it), **D. rectus*, **Sericostoma pyrenaicum*, *Hydropsyche pellucidula*, *Philopotamus montanus*, **Rhyacophila tristis*.

With these were also two insects taken at Caunterets from the 1st till the 8th of July—one *Chloroperla grammatica*, which is subject to the same doubt as the specimen above; and one female *Ascalaphus coccajus*. The insects with which an asterisk (*) is placed are non-British species.—W. J. LUCAS; Kingston-on-Thames.

CAPTURES AND FIELD REPORTS.

AGROTIS YPSILON IN EARLY JULY.—While sugaring on the sand-hills at Deal on Saturday last, July 4th, I found a very worn *Agrotis ypsilon*, male, on one of the patches. I took it to make quite sure of its identity. Surely this is a very late date for a hybernated specimen, more particularly a male? I see in South's 'Moths of the British Isles' a *suggestion* that this species migrates, so possibly this record may be of interest if the question of its migration is not yet established.—P. A. CARDEW (Capt. R.A.); St. Aldwyns, Park Avenue, Dover, July 6th, 1908.

PLUSIA MONETA AT PETERBOROUGH.—The following item may be of interest in your "Field Captures" column:—*Plusia moneta*. I was fortunate enough to take a good specimen of this on July 5th, 1908, about 11.30 p.m., on a mixed herbaceous border in my garden, Broadway, Peterborough. I have not heard of its being taken in this district before, and should be glad to hear if there is any record of its capture so far north or in this neighbourhood.—Geo. T. NICHOLS, Peterborough, July 7th, 1908.

ACIDALIA EMUTARIA IN SUSSEX.—This insect, which has only once before been recorded as taken in East Sussex, was found by myself and Mr. W. Jarvis in some numbers while searching for *Sentia maritima* in the valley of the Cuckmere; we also found the species, but in lesser numbers, on the Ouse, while trying to turn up *S. maritima* on that river. The only other record, as referred to above, is nearly thirty years old, a single specimen having been taken in the Lewes Marshes (Ouse) by Mr. J. H. H. Jenner, F.E.S., of this town in 1880.—A. J. WIGHTMAN; Lewes.

ARGYNNIS PAPHIA VAR. *VALESINA* IN GLOUCESTERSHIRE.—I sent a note to this journal in 1906 stating that *Argynnis paphia* var. *valesina* occurred in woods near the town. Yesterday I was strolling through the same woods, and again had the pleasure of viewing it at the bramble-blossoms amongst a number of the ordinary type, all in fine condition. *A. aglaja* was also fairly abundant, but appeared to be rather worn. *Melanargia galatea* has been, and still is, the commonest butterfly on the hill-sides this season.—V. R. PERKINS; Wotton-under-Edge, July 21st, 1908.

HYLOICUS PINASTRI IN THE BOURNEMOUTH DISTRICT.—It may interest you to know that while dusking in my garden last night, I captured at honeysuckle a fine specimen of *Hyloicus pinastri*. I have not heard of any previous records of this insect in this neighbourhood, and it will be interesting to observe if other captures follow this one. Branksome Park would seem to be favoured by Sphingidæ, for within the last four years my garden has yielded me no fewer than seven species, viz.:—*Sphinx ligustri*, *S. convolvuli* (eight), *Smerinthus populi*, *S. ocellatus*, *Phryxus livorica* (one), *H. pinastri* (one), and *Macroglossa stellatarum*.—EDWARD P.

REYNOLDS ; Headinglea, Branksome Park, Bournemouth, July 12th, 1908.

SENTA MARITIMA IN SUSSEX.—During the present season, together with my friend Mr. W. Jarvis, of this town, I have been successful in finding *S. maritima* and its vars. *bipunctata* and *vismaricensis* in Sussex. The species is very local, and not by any means plentiful among the thick reed-beds in the valley of the Cuckmere. It may also be interesting to note that *C. senex* and *L. straminea* also occur in the same locality. I think I am correct in saying that *S. maritima* has never before been recorded from this county, and both *senex* and *straminea* are considered very rare on our East Sussex list.—A. J. C. WIGHTMAN ; Lewes.

LEPIDOPTERA IN THE SALISBURY DISTRICT.—Possibly the following captures which I have made up to now this season may be of some interest to your readers. In April last I captured one specimen each of two "pugs," *Eupithecia consignata* and *E. virguata*. Both were taken at street-lamps in the town. Three weeks ago I captured a remarkable aberration of *Eupithecia rectangulata*. It was black on all four wings, with the veins strongly marked with silver-grey metallic scales. Had it not been for the shape of the insect I could not have identified it. On June 29th and 30th and July 1st I captured *Triphana subsequa* at dusk on the heath at Whaddon, Wilts. I took altogether ten specimens, and saw several more which I could not capture. I fancy this insect has not previously been recorded for this county, although I took four specimens two years ago at Clarendon Wood near here, which I did not record at the time. But what struck me as remarkable was the fact that I had previously worked the heath very assiduously for three years without seeing a single specimen, and now they crop up in such large numbers. And again, last Sunday I captured a specimen of *Limenitis sibylla* at the side of the same heath, and saw others flying around the tops of the oak-trees. Is not the date, July 5th, somewhat early for this insect? I also took several specimens at this same locality last year, but did not see the first specimen until July 19th last year! Another fact seemed to me remarkable. On July 14th this year *Argynnis selene* was out in swarms on the heath, and *A. euphrosyne* was over. On July 5th only two specimens of *A. selene* were seen there all day, and they were both very badly worn. And yet last year they were only just emerging about the middle of July!—W. A. BOGUE ; Salisbury, July 7th, 1908.

DEILEPHILA EUPHORBIE AT BOURNEMOUTH.—On July 12th, 1908, whilst taking *Heliothis dipsacea* at Canford Cliffs, Bournemouth, I disturbed from privet (in flower) a female *Deilephila euphorbiæ*. This was near the edge of cliff where I took *D. livornica* two seasons ago. It is in good condition.—W. G. HOOKER ; 125, Old Christ Church Road, Bournemouth.

NONAGRIA DISSOLUTA VAR. ARUNDINETA, ETC., IN SUSSEX.—On the 22nd inst., when collecting *Senta maritima* (*ulvæ*) in the Cuckmere Valley with my friend Mr. A. J. Wightman, of Lewes, I also took

N. arundineta. I believe the latter has not been recorded for Sussex before.—EDWIN P. SHARP; 1, Bedford Well Road, Eastbourne.

SPRING NEUROPTERA AT BUDE.—I received from Dr. T. A. Chapman six insects taken at Bude in Cornwall on May 28th, 1908. They were *Isopteryx torrentium*, one; *Panorpa germanica*, one male; and *Limnophilus centralis*, four.—W. J. LUCAS; Kingston-on-Thames

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Wednesday, June 3rd, 1908.—Mr. H. Rowland-Brown, M.A., Vice-President, in the chair.—Mr. H. St. J. Donisthorpe brought for exhibition pseudogynes of *Formica sanguinea*, caused by the presence of the beetle *Lomechusa strumosa* in the nest, from the New Forest.—Mr. H. J. Turner showed living larvæ of *Coleophora maritimella* on *Artemisia*, and also a species of Asilidæ and its prey.—Mr. C. J. Gahan exhibited living specimens of a "leaf-insect" from the Seychelles, bred in England by Mr. St. Quentin, probably *Pulchruphyllium crurifolium*, Serville; and Lampyridæ of considerable interest collected by Mr. E. E. Green in Ceylon, including both sexes of the genera *Lamprigera* and *Diophtoma*, the larviform females of which had hitherto been unknown. He called attention to the existence in China, Ceylon, and the Malay Peninsula of remarkable larviform females greatly resembling in form the females of the American group *Phengodini*, and being somewhat similarly provided with rows of luminous points. Mr. R. Shelford remarked that in several of the Malacoderm Coleoptera from the Malay Archipelago, regarded as larval or apterous forms, the males and females were indistinguishable, and underwent practically no metamorphosis.—Mr. G. C. Champion, specimens of *Dromius angustus*, Brullé, and *Cryptophagus lovendali*, Ganglb., recently recorded by him from Woking and the New Forest respectively; also two species of the Staphylinid genus *Leptotyphlus* and one of the Curculionid genus *Aluocyba*, minute blind South European insects, much smaller than any known British representatives of the groups in question.—Col. C. Swinhoe, several boxes of butterflies taken by him during the present year (1908) in the Canary Islands, chiefly from Grand Canary and Teneriffe. He drew attention to the fact that with the exception of *Lampides webbianus*, all the species met with suggest a foreign origin.—Mr. J. E. Collin communicated "Notes on the Value of the Genitalia of Insects as Guides in Phylogeny," by Mr. W. Wesché, F.R.M.S.—Dr. D. Sharp, M.A., F.R.S., communicated a paper "On certain Nycteribiidæ, with Descriptions of Two New Species from Formosa," by Mr. Hugh Scott, B.A. (Cantab.).—Dr. J. L. Hancock, M.D., communicated a paper on "Further Studies of the Tetriginæ (Orthoptera) in the Oxford University Museum."—Mr. J. C. Moulton read a paper on "Mimicry in Tropical American Butterflies."—Professor E. B. Poulton, F.R.S., read a paper on "Heredity in *Papilio dardanus* from Natal, bred by Mr. G. F. Leigh, F.E.S., of Durban," and exhibited, in illustration, a large series of the forms of *P. dar-*

dunus from Natal and Chirinda.—Mr. Hamilton H. Druce, F.L.S., read a paper on "New Species of Hesperiidæ from Central and South America," and exhibited the specimens described, also a series of the subfamily Pyrrhopyginae, together with the genus *Erycides* of the subfamily Hesperinae, showing the great similarity of some of the species with those of the Pyrrhopygine genus *Jemadia*, and also pointed out that the subfamily Pamphilinae contained genera with species again almost exact copies of those shown in the two previously mentioned subfamilies.—Mr. F. Merrifield proposed a vote of thanks to the Fellows who had been instrumental in the organization of the Conversazione, and the Vice-President begged to be allowed to mention in particular the services rendered by Mr. R. Adkin and Mr. Stanley Edwards, who had undertaken the whole work of arrangement in connection with the exhibitions. The vote of thanks was unanimously given.—J. J. WALKER, M.A., R.N., *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—May 14th, 1908.—Mr. Alfred Sich, F.E.S., President in the chair.—Dr. Chapman exhibited a larva of *Lycena semiargus* from a Pyrenean ovum, nearly full grown, and he called attention to the curious fine brown scaling in a bred Pyrenean example of *Tanagra atrata*.—Mr. Adkin, from Mr. McArthur, from Aviemore, nodules of resin on twigs attacked by *Retinia resinana* larvæ, a curious "mop" of twigs on a branch of fir, no doubt caused by a gall, and cocoons of *Dicranura vinula*, opened by birds?—Mr. Harrison, a living larva of *Phorodesma smaragdaria*.—Mr. Newman, larvæ of *Dryas pupha*, *Argynnis aglaia*, and *A. adippe*; one set had been wintered outdoors and were very small, the others kept in a cool house were in their last instar. He showed ova of *Vanessa atalanta* just hatching.—Mr. Edwards, specimens of *Papilio astorion* and *P. philoxenus* from North India, and *P. varsciewiczii* from Bolivia.—Mr. Rayward, a considerable number of Lepidoptera, which he was placing in the Society's cabinets.—Mr. A. H. Jones, a number of butterflies taken in Hungary to illustrate his paper, "Notes on Hungarian Butterflies," including *Neptis lucilla*, *N. aceris*, *Limenitis populi*, *L. camilla*, and *L. sibylla*, taken together in one forest opening; *Chrysophanus alciphron*, extremely large and boldly marked; *Colias myrmidione* ab. *alba*, a parallel form to var. *helice* of *C. edusa*; the local *Erebia melus* (with which he had placed *E. lefebvrei* from the Pyrenees and *E. glacialis* v. *nicholli* from Campiglio for comparison), *E. medusa* var. *psodea*, *C. thersamon*, *Pararge climene*, *P. rozelana*, *Canonympha edippus*, &c.

May 28th.—The President in the chair.—M. J. St. Aubyn, of Balham, and Mr. N. D. Riley, of Upper Tooting, were elected members.—Mr. Main exhibited living larvæ of a species of "Stick" insect.—Mr. West (Ashted), a series of *Anticlea badiata* bred from larvæ taken on his rose trees.—Mr. Tonge, stereoscopic views of the ova of *Saturnia carpini* and *Macrothylacia rubi*; of the ova of *Malacosoma castrensis* and *M. franconica*; and of fertile and infertile ova of *Panolis piniperda*.—Mr. Newman, pupæ of *Dryas pupha*, *Argynnis adippe*, and *A. aglaia*.—Mr. Rayward, pupa *in situ* of *Trochilium crabroniformis*, and pupa case of *Ægeria culiciformis*. The former emerged downwards and the latter upwards.—Mr. Carr,

an imago and cocoons of *Earias chlorana*.—Mr. Turner, a long series of *Pancalia lewenhoekella* from Box Hill, a short bred series of *Swammerdamia griseo-capitata* from Oxshott; and the very beautiful Hydrocampid, *Ambia instrumentalis*, from North India.—Mr. Gilbert Arrow gave an address, with lantern slides and numerous specimens, on "The Origin and use of Horns in Coleoptera."

June 25th, 1908.—Mr. Alfred Sich, F.E.S., President in the chair.—Mr. Tonge exhibited a large species of mayfly (*Ephemera*) in the penultimate stage.—Mr. Goulton, living larvæ of *Tethea subtrusa* taken in Surrey.—Mr. Rayward, batches of ova of *Macrothylacia rubi* found on heather tops at night, when they were very conspicuous.—Mr. Edwards reported the capture at Blackheath of a male and female *Amphidasys betularia* var. *doubledayaria* in cop.—Various members gave notes on this season's captures and observations.—HY. J. TURNER, *Hon. Rep. Sec.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. May 19th, 1908.—Rev. C. R. N. Burrows and Mr. F. N. Pierce exhibited about one hundred imagines of the *Hydræcia nictitans* group, including eighty-seven specimens, the genitalia of which had been mounted for the microscope and were also exhibited. As a result of the examination of male genitalia the specimens had been separated into four groups:—(a) *H. nictitans* (the woodland form), (b) *H. paludis* (marsh form), (c) *H. lucens* (Lancashire moss form), (d) an apparently new species, at any rate as regards Great Britain, taken by Messrs. Bacot and Simes on the banks of the Crinan Canal, N.B., and provisionally named *crinanensis*. A single specimen received from Dr. Chapman, labelled "Turkestan," also belonged to this latter species. Rev. Burrows stated that a less extensive examination of female genitalia indicated the probability of their being equally easy to differentiate; he also pointed out that with the aid of wood naphtha it was possible to examine the genitalia *in situ*, and thus avoid mutilating the specimen.—S. J. BELL, *Hon. Sec.*

BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.—The newly constituted Entomological Section (the old Birmingham Entomological Society) held its first meeting after the amalgamation on April 13th, the President, Mr. Geo. Bethune-Baker, F.L.S., F.Z.S., F.E.S., in the chair.—The resignation of Mr. Colbran J. Wainwright, F.E.S., from the hon. secretaryship, after nineteen years' service, was received with great regret, and Mr. A. H. Martineau was elected to fill the office for the present year.—The President exhibited and described some Lycænidæ from Australia, all of which are associated with ants during some portion of their life-history.—Mr. H. Willoughby Ellis, F.Z.S., F.E.S., gave an account of the present knowledge of British Myrmecophilous Lycænid larvæ, and gave a list of records to date with remarks on the methods employed by the ants in obtaining the juices from them. He also gave an account of the British Myrmecophilous Coleoptera, with special mention of the work he and Mr. A. H. Martineau had carried out in the Midlands during the past year.—Mr. A. H. Martineau showed specimens of *Formicoxenus nitidulus*, Nyl., from the nests of *Formica rufa*, L., at Knowle (Warwickshire).—Mr. Herbert Stone, F.L.S., showed a piece of

marble-ebony sapwood, showing ebony around the galleries of insects, also lancewood similarly ebonized.—Mr. Hubert Langley, specimens of *Asthenia pygmaea*, Hb., and *Anybia epilobiella*, Roem., both from Princethorpe, both being additions to the Warwickshire list.—Mr. H. Willoughby Ellis read a short paper on the present knowledge of the genus *Dinarcla*, Grav., embodying the work of Donisthorpe and Wasman; also his own observations of the species collected from the nests of *Formica rufa*, L., and *F. sanguinea*, Latr., and from a number of specimens received from friends.—ALFRED H. MARTINEAU, *Hon. Sec.*

RECENT LITERATURE.

Additions to the Wild Fauna and Flora of the Royal Botanic Gardens, Kew. VII. (Bulletin of Miscellaneous Information, No. 3, 1908.)

ENTOMOLOGISTS will be interested in this number, which contains a list of Coleoptera and ants contributed by Mr. H. St. J. Donisthorpe, and one of Aphidæ and Coccidæ by Mr. R. Newstead. Of the four lists, that of the ants seems of greatest interest, owing to the number of non-British species it contains.

Nuevo Tricóptero de Espana. (Boletín de la Real Sociedad española de Historia natural.) By R. P. LINGÜOS NAVÁS, S.J. Illustrated. April, 1908.

Leptocerus zapateri, the new species, is described in Latin, and named after B. Zapater, lately dead, a friend of Navás.

W. J. L.

OBITUARY.

WITH very great regret we have to record the death of Mr. W. H. THORNTHWAITHE, on June 27th last, aged fifty-eight years. Only a fortnight previously he conducted a party of the members of the South London Entomological and Natural History Society to some private ground at Box Hill; and he himself was then keenly engaged in collecting Tortrices, &c., and seemed in no way distressed by his labours on the rough hillside. On the evening of June 25th, when dining at the Savoy Hotel, he was suddenly attacked by his fatal illness. Although he rarely contributed to the literature of his study, Mr. Thornthwaite had amassed a considerable collection of British Lepidoptera, both "Micro" and "Macro"; and quite recently he was busy in rearranging the Pterophoridae and other groups in accordance with the most recent classification. For a number of years he had been Chairman of the Board of Directors of the Gresham Life Assurance Society, and this position he held at the time of his decease. By all who knew him he will be greatly missed.

WE are also very sorry to hear that Mr. THOMAS MADDISON, F.E.S., died suddenly on July 16th last while on a visit to Scarborough.

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[No. 544

JOTTINGS ON APHIDES TAKEN DURING 1907 AND 1908.

BY CLAUDE MORLEY, F.E.S., &c.

SOME notes upon the results of a few months collecting Aphididæ may not be entirely without interest, since the family is so generally shunned by the "pure entomologist" that one never sees anything respecting it in current literature. Last year I was anxious to add to the six thousand species which constitute the known insect fauna of Suffolk, and began to name such Aphides as I saw with the aid of the four volumes of Buckton's 'Monograph of the British Aphides,' published by the Ray Society, 1876-1883. This I have followed with slavish exactness, and have succeeded, by examining the insects while hardly dead, in naming *every specimen* whose food-plant was known to me with conscientious certainty, which reflects high credit upon the Monograph, though one could sometimes wish the figures were less artistic and more scientifically drawn, and the descriptions fuller. It is, however, often impossible to determine single-winged specimens found on, very probably accidental, plants. I had no previous knowledge of the subject, which I approached from the point of view of the species' pabulum; I drew up a list of every food-plant indicated by Buckton—one hundred and ninety-eight indigenous kinds—and found it an invaluable guide in the absence of specific tables. Several, usually many, individuals of a species occur together, so that it may be carded in various advantageous positions in its larval, pupal, and dimorphic perfect states (I have taken no males, which are rare and always autumnal); but the examination must be immediate, since the colours are evanescent and the form shrivels. Except where stated, the following were taken during these two years in the garden at Monks Soham House, Suffolk. Aphides were abundant everywhere in 1907, but during 1908 their scarcity is very remarkable.

The first of the Aphidides group of the subfamily Aphidinae, and one of the most prevalent, was *Siphonophora rosae*, Linn., which was seen upon the young shoots of both wild and cultivated roses throughout the summer, as well as upon the under side of the leaves of adjacent *Aquilegia vulgaris* at the end of July; from these latter I bred several parasitic Aphidii. *S. scabiosa*, Schr., I have not found here, but I took many apterous females and larvæ on the stems of an unrecorded food-plant, *Dipsacus sylvestris*, at the Haven Street Woods, in the Isle of Wight, at the end of June, 1907. It was August 22nd last year before I looked for *S. granaria*, Kirby, but harvest had hardly begun, and I at once found both imaginal forms commonly on some adventitious ears of wheat in the garden, though all these were dead (fourteen of them on one ear had been "stung," and will doubtless produce Buckton's *Ephedrus plagiator* or *Lygocerus carpenteri*, cf. Marshall, Bracon. d'Europ. ii. 544), and one or two live apterous females on barley-ears in adjacent fields. Apterous *S. hieracii*, Kalt., were very rare beneath the flower-heads of *Hieracium* in early August, associating with a few females and pupæ of *Aphis rumicis*. As early as June 1st larvæ of *S. millifolii*, Fab., appeared on the flower-stalks of *Chrysanthemum segetum*, and in early August both winged and apterous imagines have been fairly common on the stem of both this plant and *Achillea millefolium*, becoming abundant by the middle of the month. No Aphid has been specified as the victim of *Diodontus tristis*; on 17th last year I saw a female of this Fossor alight on a flower-head of *C. segetum*, about 2 p.m. in dull and windy weather, walk below the flower, down the stem, over three or four larvæ of the *Siphonophora*, of which she seized the following one in her mandibles with a sudden snap; she immediately rose in the air, and, after one or two circlings, made off with it; the larva was about one-third grown (cf. Buckton, ii. 167). At the end of July I have found *S. pisi*, Kalt., in all its stages, not very commonly on garden peas and the leaves of *Bursa bursa-pastoris*; it is not common enough to have been a pest either year. In 1903 I took it near Ipswich on *Urtica dioica* as late as October 27th. *S. rubi*, Kalt., has not been observed till the first week in August, when both imaginal forms and quite young larvæ occur on the under side of leaves of *Rubus fruticosus*, with *Aphis urticariæ*. *S. urticæ*, Kalt., has been scarce; I have taken only one apterous female, still attached to the pupal skin, on *Urtica dioica*, on August 2nd. The distinct *S. avellanæ*, Schr., also appears rare, since of this I have only found an apterous female beneath a leaf of *Corylus avellana* early in June. Larvæ, pupæ, and apterous forms of *S. tanacetii*, Linn., abounded in the heart of a constantly-mown dandelion on a lawn on August 13th, 1907. Beneath leaves of *Tussilago farfara* numerous dead *S. tussilaginis*, Walk., both winged and apterous, with a few larvæ, were found early in the

same month, and a diligent search revealed but two live alate forms. *S. sonchi*, Linn., in its apterous form, is one of our commonest species on *Centaurea nigra* in May; on the 31st I have taken several "stung" females, from which the Braconid, *Aphidius granarius*, Marsh., emerged on June 1st, and subsequently several Cynipids; the same form was found on *Cnicus arvensis* in August. This species does not attack *Sonchus oleraceus*, which was abundant in this vicinity till quite the end of July, when the apterous and alate forms, together with their pink (not black, as on knapweed) larvæ, are abundant in the heads and on the stems, and have continued so to the present time; on August 13th last year I observed a female *Bassus tarsatorius*, Panz., investigating, without apparently attacking, a brood of these Aphids. There is no *Cichorium intybus* here, but I have found larvæ, pupæ, and apterous imagines (a few of which latter were "stung") of *S. cichorii*, Koch, upon the stem, just below the flower, of this plant near Easton Park, Suffolk, on August 17th; no winged specimens were seen there nor on the same plant at Dunwich, in Suffolk, where it occurred sparingly in September. Five *S. olivata*, Buck., were taken on *Cnicus palustris* in the Bentley Woods, near Ipswich, August 11th, 1904. I have searched in vain (fortunately) for *S. lactucæ*, Kalt., and (unfortunately) for *S. convolvuli*, Kalt., in my garden.

The small *Phorodon humuli*, Schr., was abundant, though I could detect no winged forms and but few apterous imagines covering the under side of leaves of *Humulus lupulus*, near Easton Park on August 17th last; and a protracted examination of *Lamium album* in my garden revealed a solitary winged and active *P. galeopsidis*, Kalt., on the under side of a leaf, on the 2nd of the same month. On June 7th, 1907, twenty-three *Myzus cerasi*, Fab., in all its stages though only two winged, were given me from *Prunus cerasus* in this parish, where it is doubtless but too common; and early in August I have found *M. ribis*, Linn., rarely on the under side, near the midrib, of leaves of *Ribes rubrum* in my garden—larvæ were then the commonest form, and only one alate specimen was seen. Quite suddenly, on August 4th last, *Drepanosiphum acerina*, Walk., appeared commonly beneath maple-leaves and the adjacent hazel and *Cornus sanguinea*; the winged form is always much the commoner, though I have seen three apterous ones beneath a leaf with it and many more singly. It is the most active Aphid I know, and takes flight at once, in sun or shade, upon being disturbed, though more sluggish towards dusk; it also possesses a feeble power of leaping. Apterous females, larvæ, and pupæ of the distinct and presumably rare *Megoura viciae*, Buck., were found very commonly feeding upon the pods and stems of one plant of *Lathyrus pratensis* in a meadow near Easton Park on August 17th last. Early in June *Rhopalosiphum ribis*, Linn., has been found in hundreds in all its stages

in leaves of *Ribes nigrum* in my garden; these they curl, and the habitation so formed also gives protection to Syrphid larvæ, which work great havoc among these Aphids. Three of the latter pupated on the 8th, and became perfect *Syrphus ribesii*, Linn., towards the end of the month.* *R. nymphaeæ*, Linn., was abundant on the stalks of *Alisma plantago* in July, and also on *Nymphaea alba* in August in the moat which surrounds my house, both this and last year, but among thousands of the apterous forms I could find but a single winged specimen; I omitted to breed the parasitic Cynipid (not Braconid, cf. Buckton, ii. 153), *Allotria erythrocephala*, said to so extensively and beneficially prey upon it. A very few winged females and pupæ only of *R. ligustri*, Kalt., were taken on August 2nd, 1907, on the under side of leaves, just below the flowers, of *Ligustrum vulgare*. Exclusively winged forms of *Siphocoryne pastinacæ*, Linn., have been found on the flower-stalks of wild *Daucus carota*, both here and in the adjacent parish of Bedford, in early August; also on broad beans in my garden in early June. *S. xylostei*, Schr., is a curse on *Lonicera periclymenum* over the house-windows, though, curiously enough, honeysuckle in the garden and orchard a hundred yards away appears exempt; in such numbers are they that in 1906 the flowers were all distorted and aborted. *S. capreae*, Fabr., occurs commonly at the apex of the shoots and sparingly in the centre of the under side of young leaves of *Salix alba*, like *S. xylostei*, throughout the summer. The only *S. fœniculi* I have seen are three examples, one of which was "stung," on fennel at Dunwich, by the roadside, in the middle of last September.

(To be continued.)

NOTES ON SOME ANDALUSIAN BUTTERFLIES.

By W. G. SHELDON, F.E.S.

THAT most delightful experience, a spring holiday on the Mediterranean, has become an annual necessity to those of us whose pursuits are entomological or otherwise, and who have once tasted its joys.

We all, of course, first make for the Riviera, and revel in the sunshine and in the clouds of butterflies there to be found from

* William Kirby wrote Letter IX. of the 'Introduction to Entomology,' and it must be Barham Parsonage, Suffolk, to which he refers when he says (7th ed. p. 152):—"It was but last week that I observed the top of every young shoot of the currant-trees in my garden curled up by myriads of these insects. On examining them this day, not an individual remained, but beneath each leaf are three or four full-fed larvæ of aphidivorous flies, surrounded with heaps of the skins of the slain, the trophies of their successful warfare." Evolution seems slow in these matters. Perhaps their government is not "progressive"!

March to May; but a very few holidays so spent exhaust the novelty of even the numerous species of this favoured clime, and we sigh for new worlds to conquer.

After the "côte d'azur" one's thoughts naturally fly to Andalusia, for one gathers from 'Baedeker' that the climate is at least as enjoyable, and favourable to the production of spring butterflies, as the shores of the French Mediterranean; at Granada, Cordova, and elsewhere, exist magnificent remains of a civilization which a thousand years ago was the most advanced in the world; the peerless Sierra Nevada, rising some 12,000 ft. out of the sea, is there; and there Europe makes its nearest approach to the tropical in climate, producing sugar-cane, custard-apples, and other fruits and plants in profusion, whilst, most important of all from one point of view, certain charming Diurni are in Europe only found there, and of those occurring which are found in Europe outside Spain several have forms peculiar only to that country.

Andalusia all the winter had been the subject of my meditations, and arrangements being made, I left England accompanied by my wife and daughter on April 2nd last, travelling by the long overland journey *via* Barcelona and Madrid.

Stoppages at these and other places made it the 12th of April before we reached Andalusia, at Cordova, where we stayed a couple of days to see the mosque and other sights. I did not do any actual collecting at Cordova, but found the environs very pretty and, incidentally, saw a good many butterflies, including *Euchloë euphenoides*, and something that looked like *Anthocharis belemia*; no doubt good work could be done by devoting a little time there. On the 14th we journeyed on to Ronda, some six hours ride by rail, where we contemplated staying a week.

Ronda is very beautifully situated in the midst of a grand amphitheatre of mountains, at a height above the sea of about 2500 ft.; the town is cut in two by a fine gorge, formed by the river Guadalevin, 350 ft. deep, and spanned by a bridge of a single arch. Ronda has other features not so inviting; the usual adjuncts of sanitation are practically non-existent, and it is certainly the most malodorous town I have ever stayed in; the occupation of a large portion of the adults, and practically of all the children, consists of mendicancy, and they are most pertinacious and annoying in the exercise of their profession. Vultures abound, and it is a grand sight to watch these immense birds come sailing up the huge gulf in the mountains below the town, to see if any horses have been thrown out of the bull-ring for them to feed upon. The weather, which had been magnificent for weeks previous to our arrival, broke up on the day we came, and for four days I did not see an insect fly; on the 19th, however, the sun rose in a cloudless sky, and having well explored the ground previously, I started betimes; it was well I

did so, for the sky gradually clouded over, and in the early afternoon the sun was hidden for the day. The best, and probably the only good collecting ground at Ronda, is to be found on the right bank of the Guadalevin, some mile and a half below the town, immediately where the river leaves the meadows and enters a gorge; this ground extends down the bank of the river a mile or more, and is especially good on the top of the cliffs just before the river enters the gorge; it is best reached by walking along the top of the cliffs, past the Hotel 'Reina Victoria,' and the new cemetery. On this spot butterflies were very numerous, the most abundant species being easily the very local *Anthocharis tagis*, which of course in its type form is in Europe peculiar to Southern Spain. *A. tagis* has much the habits and flight of the Provence form of the species, var. *bellezina*, like it floating slowly along the edge and upper portions of the precipices it haunts, though one meets with it more sparingly on the lower slopes and down by the river. It is said by Lang and Kane to feed upon *Iberis pinnata*; I do not know this plant, but an *Iberis*, white, about six inches in height, and not very far from the old garden candytuft, was growing, wherever I saw the butterfly at Ronda and elsewhere. The female settled upon it repeatedly, but though searching carefully I could not find any ova; I did, however, find a larva, which fed up and pupated; this larva and pupa closely resembled the description of *A. tagis* given in Lang, though it might have been *A. belemia*. Unfortunately it has since died, so the question of its identity will not be solved. I have, however, little doubt but that this *Iberis* is the food-plant of *A. tagis* in Spain; the specimens captured, some thirty in number, were in very good condition. With this species flew, in less numbers, another Andalusian speciality, *A. belemia*, the only typical specimens I saw in Spain, and its var. *glauca*. I think *A. belemia* is the swiftest winged butterfly I have ever viewed flying; those who have seen *A. belia* on the wing will appreciate what I mean when I say that in my judgment *A. belemia* could give the other species twenty yards in a hundred; it is of course quite useless to attempt to run it down, but this butterfly becomes an easy victim once its habits are known. Like other Diurni, it has a weakness for flying along the edge of a ridge, or, better still, round and round a knoll; one can stand there and intercept it in flight quite comfortably, and one may strike again and again without in the least alarming it. *Thais rumina* was common, but most of the specimens were in bad condition; I saw but missed a fine deep yellow form, which could not be far from ab. *canteneri*, and was certainly the best form I saw in Andalusia. Most of the *T. rumina* one sees in collections have the ground colour of the wings very little, if at all, more richly coloured than those of the French form var. *medesiaste*, and very few of them are of so strong a yellow tint as

the figure in Lang's book; of the specimens I obtained in Andalusia, not more than twenty per cent. would resemble the example figured in depth of colour. A species that I did not expect to meet with here was *Melanargia ines*, of which I netted a few males. *Anthocharis belia* was common, examples both of the first and of the second broods were captured in some numbers. *Euchloë euphenoides* occurred not infrequently down by the river in the gorge, and two or three battered specimens of *Papilio podalirius* var. *feisthamelii* flew wildly on the top of the cliffs. Of other species I noted *Pontia daplidice* var. *bellidice* common, and *Pararge megæra* and a skipper I have not yet been able to name; it is of the *Hesperia alveus* group, but is not *H. alveus*.

The following morning, April 20th, looked equally promising, early, and this being my last day at Ronda, I decided to devote it to a search for *Cupido lorquini*, which my friend Mr. E. F. S. Tylecote met with some years ago not infrequently in the mountains some four or five miles east of the town; this proved a fatal error of judgment on my part, for, although the valley round Ronda basked in the sunshine all the morning, clouds soon gathered, and persistently hung round the summits I was amongst, and consequently my attempt resulted in a failure: this turned out to be even more disastrous than I then realized, for I did not succeed in meeting with *C. lorquini* elsewhere in Andalusia.

On April 21st we went on to Algeciras, where we stayed until the 29th. I did not find Algeciras a very fruitful locality for Lepidoptera; there were a few *Anthocharis belemia* var. *glaucæ*, *Thais rumina*, *Euchloë euphenoides*, and some other species of general distribution, flying in the vicinity of the well-known waterfall, two miles back in the mountains; and I netted a fine specimen of *Pyrgus proto*, and saw a very large hybernated example of *Eugonia polychloros*. The best ground for butterflies in the district is, undoubtedly, the very beautiful cork-woods of Almoraima, some nine miles inland; these woods are many miles in extent, and are intersected in places with impassable swamps; the ground containing many specimens is very limited in extent, and almost impossible to find unless you have a guide. I was, however, fortunate in meeting, on my first journey there, with Colonel Willoughby Verner, who resides at Algeciras during a portion of the year, and whose researches in Andalusian ornithology are so well known. Colonel Verner was out on an expedition after birds, and seeing I was a stranger most kindly took me in hand and piloted me to the best locality in the woods, which is some three or four miles east of the railway station, and consists of a group of kopjes, about 200 ft. high, and the valleys or depressions between them. Here I found *Thais rumina* abundant and in fine condition; *Euchloë*

euphenoides also was common, and amongst the white *Iberis* noticed at Ronda *Anthocharis tagis* flew in some numbers; these *A. tagis* were, however, a remarkable race, much larger than the Ronda specimens, and having an average wing expanse of 45 mm., whereas the majority of the specimens taken at Ronda and Granada—the only other places I met with the species in Spain—did not average more than 38 mm. in expanse; this large form had also a much more powerful and swift flight, and was, on the wing, not distinguishable from *A. belia*. Other species observed were *Nomiades melanops*, *Pararge egeria*, *Polymnatus agestis*, and *Pontia daplidice*. *Colias edusa* was common. *Epinephele pasiphae* was just emerging, and females were found on April 27th. Apart from the Lepidoptera, the cork-woods are well worth a visit for their wonderful avifauna. Thanks to Colonel Verner, I saw or recognized the notes of a great number of most interesting birds, including bee-eater, hoopoe, golden oriole, kite, and Egyptian vulture (on nest), and was informed that pairs of goshawk, Bonelli's eagle, marsh harrier, and other Raptores were then nesting in the woods.

In the Alameda gardens, at Gibraltar, the larvæ and curious pupæ of *Zygæna bætica* were not infrequent on *Coronilla glauca*.

The weather during my stay was very delightful, with a good deal of sun each day and a minimum shade temperature of about seventy-five degrees.

On the morning of April 29th we travelled on to Malaga, a ten hours journey; this route is a very attractive one, traversing some fine gorges, and with splendid mountain views most of the distance. As we approached Malaga the train passed for many miles through orange orchards, which loaded the air with the perfume of their blossom. Large birds of prey were seen at intervals, and a pair of magnificent eagles hovered quite close to the train in a gorge a little to the south of Ronda, where they were evidently breeding.

Malaga enjoys the highest mean temperature of any locality in Europe, and consequently produces certain tropical plants that are not grown elsewhere, including the sugar-cane, large plantations of which exist; custard-apples and bananas are also extensively grown. The weather was cloudless during our stay, but abnormally hot for the time of the year, the shade temperature each day running well up to ninety degrees, and on one day it reached ninety-six degrees.

The town is very dusty and insanitary, but the surroundings are picturesque; it is better, therefore, to stay in the suburbs, and we found charming quarters at an English pension, the 'Hacienda de Giro,' an old Spanish mansion situated in the midst of a beautiful tropical garden in the suburb of Caletas, about a mile and a half east of the town, and on the shore of the Mediterranean. I found butterflies in great abundance on

all the hills that fringe the coast east of Malaga; perhaps the best spot is reached by taking the electric tram towards the village of Palo, and getting off where the road crosses the bed of a torrent—dried up at this period of the year—about half a mile before Palo is reached, along the east side of this torrent, is a path leading to the foot-hills, which extend to within a few hundred yards of the coast; the highest of these eminences has an altitude of about 1500 ft., and is a prominent object from all points of view in the neighbourhood. Working up the small hills until you come to this mountain, and then traversing its lower slopes, keeping a little to the west of the main peak, you find butterflies in swarms. Most prominent perhaps in point of numbers was *Melanargia ines*, both sexes of which were in the finest condition, and my captures included a remarkable aberration with the under side of the right inferior clouded with black almost to its base. Closely following this species in point of numbers was *Anthocharis belemia* var. *glauce*. *Colias edusa* was also in great abundance, and I saw or captured about a dozen of the var. *helice*. Wherever there was an outcrop of calcareous rock *Thais rumina* was an abundant species, including some richly coloured examples; larvæ were also plentiful on *Aristolochia*. On the bushy slopes, flying slowly, were *Epinephele pasiphaë* and *E. ida* in profusion. On the summit of one of the lower slopes here I came across my first good specimen of *Papilio* var. *feisthamelii*, which I should say is a rare species in Andalusia; at any rate I did not see more than twenty examples altogether; with one exception they were found flying round the summits of isolated knolls, after the habit of *Papilio machaon*; two specimens only were netted at Malaga, and a third was seen. *Epinephele ianira* var. *hispulla* was well out, and in some numbers. Odd examples of *Pyrgus proto* were taken. Newly emerged *Gonopteryx cleopatra* were flying on May 4th. *Papilio machaon* flew here and there, the examples being very typical, and showing no approach to var. *aurantiaca*. A few each of *Lampides bætica*, *L. telicanus*, and *Nomiades melanops* were taken. On one occasion, in the hope of finding *Cupido lorquini*, I climbed to the top of the mountain, but did not observe it there, and only came across, in smaller numbers, the species found on the lower slopes.

May 7th found us training on to classic Granada.

Granada is situated at the foot of the Sierra Nevada, at a height of about 2200 ft.; outside the town, to the south and west, stretches the celebrated vega, a level plain irrigated throughout, and producing wonderful crops of corn, forage, and fruit. The Alhambra Palace and Fortress occupy the end of the aforesaid spur, which at its extremity is almost 500 ft. high, and occupies the angle between the rivers Darro and Genil. As the best, and practically only collecting-ground within easy walking distance

is this spur, it is best to stay at one of the pensions within the grounds of the Alhambra, or at the hotel 'Washington Irving,' just outside. The weather whilst we were at Granada was very fine, with practically cloudless skies, but, to us, abnormally hot for the time of the year, for several days the shade temperature running up to ninety degrees, though for the remainder of our stay it was normal—say seventy-five degrees.

(To be continued.)

A WEEK IN BROADLAND.

By C. E. RAVEN.

ONE of the greatest charms of insect-hunting is its uncertainty. If only we could pre-arrange the weather, our handbooks and lists of localities would be an accurate enough guide to rob the pursuit of its fascination. As it is, though one can be confident of success in some few cases, most of us have to look back upon night after night of cold dismal nothingness—a striking foil to the few "purple patches" of the lepidopterist's career.

It is such a purple patch that my week's holiday in the Norfolk Broads will always be.

We started, three of us, on August 1st, after a journey notable only for its abundance of infants and scarcity of porters, in a wherry from Wroxham. My friends were not entomological, and, though I had secured such information as I could from a kindred spirit who had worked a part of the district, I had brought few hopes of collecting and little apparatus—nothing more in fact than a couple of dozen boxes, a cyanide bottle, net and setting-case—the latter half full of captures taken or bred in the preceding week—and an acetylene cycle lamp, which has helped to catch many things.

On Saturday night (August 1st) we got down below Wroxham Bridge, and moored on the left bank alongside of a rough field. Here about six o'clock I found *Cænobia rufa* and *Scoparia pallida*, neither of them abundantly. As I had only once previously taken *C. rufa*—at Chatteris—I netted some half-dozen. After supper, about eight o'clock, we sculled down to the reedy thicket between the River Bure and Wroxham Broad. Here I landed, and though the herbage was almost over my head I managed to capture eight or ten *Lithosia griseola* and var. *stramineola*—the latter somewhat more common—and five *N. senex*. The few Wainscots seen were all worn *Leucania impura*. *Schœnobia mucronellus* and *Chilo phragmitellus* were the only other captures.

On the 2nd we sailed to Horning and down to the mouth of

the Ant. I looked longingly at the good land we were leaving; but my friends were eager to be at Barton regatta next day, and we passed through Ludham Bridge before mooring—in a hopeless locality which yielded nothing but a wonderful sunset over a land veiled in snowy drifts of mist.

An entomological friend had written saying that he had done well on the banks of Stalham Dyke: so to Stalham we went next day (August 3rd). Again we passed what looked ideal country, to moor in a poorer place. But on the left hand side of the dyke at its mouth there is a ragged piece of swamp, bordered with reeds and studded with a few alders and salallows. Here I landed and found the whole place alive with *C. rufa*. They were fluttering up the grass and rushes in thousands. The place was very wet, and about ten o'clock a thick white mist made further collecting useless. About nine o'clock, however, I had secured a single *Pelosia muscerda*, and besides had boxed all the Noctuæ I could not at once call *Leucania impura* or *L. pallens*. On examining these I found a fine typical *Helotropha leucostigma*, but of Wainscots there were only very abraded specimens of the two commonest species and *L. lithargyria*.

Up to this point the days had been cloudless and gloriously hot, the nights misty and decidedly cold. On Tuesday, August 4th, the weather looked like breaking: there was, as there had been, a good breeze: but the sky was overcast and there was thunder about. We moored at St. Benet's Abbey, just beyond the mouth of the Ant. On the right bank of the river the reeds had been cut to some distance from the water; but on working inland I found an isolated patch certainly not more than twenty yards by five, uncut, but of small reeds. I reached this at about 8.15, and netted a Noctua which whirled past me; on boxing it in a glass-topped pill-box, I saw that it was *L. brevilinea*. Several more followed; I lit my lamp, and as dusk came on the sight was wonderful. *Brevilinea* swarmed, flying low over the rushes. Standing still, I caught six in two sweeps of my net, as they hovered over some attraction—probably a newly hatched female. I soon filled the miserable two-dozen boxes, and was reduced to bottling them. Unfortunately my bottle was weak, and took some time to act. So I determined to return to the boat, empty my boxes and sally out again. I did so, and came out with as many as I had been able to empty, with an addition of empty match-boxes, small bottles and cigarette tins. By now, at ten o'clock, the first flight had quieted down, though many were still on the wing. I examined the salallow and alder to see if the insects resorted to them, as Mr. South in his 'Moths of the British Isles' reports. Probably there was an absence of honeydew—certainly there were no *brevilinea*. Among the reeds they were easy to see, sitting about half-way up on the flat blades; I noticed none at the reed-flowers, or at any other

blossoms—sitting thus, I secured three pairs, and filled my boxes, taking also a few very white *Tapinostola fulva*. This insect at first surprised me. Previously near Crowborough, in Sussex, I have taken only the red form and that in late September. Here I saw no red ones, though the insects were obviously fresh. The night, which had been good for moths, had been equally good for mosquitoes (I had been too busy to care for them), but after my second excursion I felt that enough had been done and suffered. I turned in, the proud possessor of forty-four *L. brevilinea*, five white *T. fulva*, and a typical *H. leucostigma*.

The next day I could hardly see or walk—the mosquitoes had feasted royally—and setting occupied much of my time. Wind and rain detained us at Potter Heigham Bridge, and the night was too stormy for nothing.

On August 6th we went down to Acle and then beat back to St. Benet's. The night was very windy; but I meant having another try at *brevilinea*. To my disgust I found my tiny reed-patch laid in swathes, and from its stubble I got nothing at all. There was a howling gale, but among the uncut beds I managed to net some dozen specimens during their dusk flight, under the lee of such bushes as there were. Then commenced the search. It is extraordinary how a small acetylene lamp brings out moths. I have not got a good eye for spotting them by day, but that night I fancy very few that came within the five-yard circle of my lamp escaped me. The reeds were waving furiously—boxing was no easy matter. But by leisurely searching between nine and ten o'clock I brought up my total for the night to twenty-five *brevilinea* and one *H. leucostigma* var. *fibrosa*. After that my eyes were so dazzled with the constant flicker of the reeds that I gave up the search—in fact I could not have seen a moth had one been sitting in front of me. Neither on August 6th nor on the 4th did I see any *P. muscerda*. *Lithosia* var. *stramineola* and a few common Geometers were all else that I noticed.

The next day we returned to Wroxham, having long journeyings before us for Saturday. I turned out at dusk to try the rough field opposite the mooring-place above the bridge, fell headlong through a screen of cut rushes into two feet of mud, and returned with nothing better than two *L. stramineola* and one *Noctua umbrosa*. Just as we were turning in a moth flew to our lamp and sat on the cabin wall. It was a last *L. brevilinea*, but whether an escape from the previous night's boxes or a genuine Wroxham specimen, I do not know. It was our farewell to Broadland.

THE *ATHALIA* GROUP OF THE GENUS *MELITÆA*.

BY GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 201.)

The under side hind wing, speaking generally, consists of five bands,* three lighter and two darker, all narrowly edged with black, but each of these bands has its own characteristics, which often help in determining the different species. The terminal light band consists of two parts, a narrow edging, bordered on each side, as in the fore wing, by a still narrower black line, and a row of light lunules, the edging being usually darker than the lunules. This band turns the corner, as it were, of the anal angle, and appears as a triangular light spot, the inner line of the border being sometimes absent. The outer dark band is also divided into two parts, consisting of a row of lunules and of the small irregular spaces between these and the black outer edging of the central light band. This latter again consists of two portions divided irregularly by a narrow dark line and broken up into spots by the nervures, the inner division, except in *deione* and *asteria*, being of a somewhat darker shade than the outer. The third and fourth spots of the outer portion, counting from the costa, stand out further from the base than the rest, conspicuously so except in *varia*, and to an exaggerated degree in *britomartis*. The inner dark band is much widened out in the centre, where it contains a spot of the colour (or of one of the shades) of the lighter bands. This we will refer to as the "light spot." The basal light band consists of five spots, of which the lowest, that on the inner margin, is frequently absent, the central one being the smallest (usually much the smallest), the diminution in size corresponding with the swelling in the centre of the inner dark band, the light spot in which has a tendency in all the species to break occasionally into the small central spot of the basal band. The actual base of the wing is again behind this band, and is cut up by the nervures into four spots, of which, as a rule, only the third (which is roughly triangular, the base resting on the fourth spot of the basal band) is at all conspicuous; sometimes, however, when the central spot of the basal band is unusually small, the second spot is easily distinguishable; the fourth, though much the largest and frequently invading the whole area of the fifth spot of the basal band, is inconspicuous, as it has the appearance, especially when this fifth spot is absent, of being a continuation along the inner margin of the inner dark band. The light bands will be referred to as the "terminal," "central," and "basal," the dark bands as the

* It is confusing to speak of either the dark or light bands as the ground colour as many authors do. If either be so, it must be the light part, as seen in the *didyma*-group.

“outer” and “inner.” The fringes on both sides of both wings are yellowish white, chequered with black or blackish.

Beyond the passages already quoted there seems to be little help towards finding distinguishing marks between these species in the earlier lepidopterists. Ochsenheimer distinguishes *parthenie* from *athalia* by (1) its smaller size; (2) its longer wing-form and finer markings; (3) its later emergence, and absence from many of the localities of *athalia*. Like most, if not all, of his predecessors and contemporaries, he ignores the fact that it is double-brooded, and emerges before as well as after *athalia*. Berce, Bergstrasse, Boisduval, Borkhausen, Duponchel, Esper, Freyer, Godart, Herbst, Herrich-Schäffer, Hübner, Knoch, Latreille, Schiffermüller, Schneider, Wallengren, and others have been tried in vain; but Meyer-Dur's illustrations show that in his time (1851) the terms *athalia*, *parthenie*, and *aurelia* were used—in Switzerland, at any rate—in precisely the sense in which they are used to-day. Modern authors, too, are but of little assistance in this matter. Neither Frey nor Favre give descriptions; I have found nothing to elucidate the matter in Oberthür; and, turning to English authors, matters are even worse. Lang's descriptions are slight and his distinctions not reliable; Kirby's are somewhat fuller, but unfortunately are not consistent with facts; and even Kane is neither so clear nor so correct as one always expects to find him, a fact of which he himself makes full acknowledgment. A fairly exhaustive (and wholly exhausting) search through the entomological journals has revealed little but regrets and complaints at the difficulty of the group, the most valuable remarks in the English journals being contained in Kane's note in the 'Entomologist' for 1886, p. 145, on the instability of the species of this group, though I cannot concur in his theory as to the relationship of the plain and mountain forms, which, however, has strong advocates. To all this one grand exception stands out in the person of Rühl, who, in the 'Societas Entomologica,' has a monumental work on the subject, extending through six numbers in its fourth year and ten in its fifth. Of course he also deals at length with these species in his Palæarctic Butterflies, but for our present purpose his work in the 'Societas Entomologica' is the more valuable. This paper deals nominally with three species only—*athalia*, *parthenie*, and *aurelia*; but, as it includes *berisalensis* under the first, *varia* under the second, and *britomartis* under the last, we are left with only three forms—*asteria*, *dictynna*, and the typical *deione*—untouched, and these, generally speaking, the most easily distinguished. Parts of this paper I have embodied in the following descriptions of the various species, to much more I shall have to refer when speaking of the variation of the group; at present I must content myself with certain definite acknowledgments, and a few criticisms of the points on

which I cannot follow his lead. First, then, it was this paper which first drew my attention to the value of the shape of the second line (the inner subterminal) on the fore wings as a distinguishing mark. Secondly, Rühl's remarks on the shape of the lunules in the outer dark band on the under side hind wing of *aurelia* were most valuable to me, as confirming the opinion I had already formed on this subject. He compares them thus with those of *parthenie* (which are practically identical in shape with those of *athalia*):—"The second row of lunules—i. e. the inner one—in *parthenie* consists of clear highly-arched bows, which, with the exception of that nearest to the anal angle, exhibit a continuous band, even, large, and completely formed. This band is also present in *athalia* and *aurelia*, but in the latter the form of the arches is essentially different. Amongst all my *aurelias* I did not find one which had all the arches of this band fully developed as in *parthenie*. . . . The well-arched lunules of *parthenie* reach a maximum height of 2 mm., and are not less than 1 mm.; in *aurelia*, even in the female, they do not reach a maximum of more than 1 mm. Instead of the even, rounded half moons of *parthenie*, they appear in *aurelia* more or less levelled, and with the corners taken off." Whilst on this subject I may add that Birkman says that the markings on the under side hind wing of *aurelia* are fainter than those of *parthenie*; this Rühl says he fails to see, but it is certainly true of the female, at any rate. Perhaps my greatest debt to Rühl is in the matter of *britomartis*. His description first set me on the track of this species in the case of the Reazzino specimens, and it is to him that we owe the recovery of Assmann's example to the National Collection, as previously mentioned. To come to a few details: he quotes from Meyer-Dur, as a distinctive mark of the female *parthenie*, a light yellow spot near the apex of the fore wing; this, he says, also occurs sometimes in *athalia*, and even in *aurelia*. This is certainly the case, and I may add that its presence is by no means universal in the case of *parthenie*. He gives as a good distinction between the males of *athalia* and *dictynna* that in the former the aborted fore legs are long and strongly hirsute, in the latter short and ill-clothed. It must, indeed, be a rare case in which it is necessary to resort to this distinction. When he speaks of the resemblance between these two species he is apparently alluding to the shape of the markings, and is doubtless, in this case, correct; but the under side of the hind wing would at once dispel any doubt as between these two species. He says that the colour of the palpi, the hair of the under side of the body, and the colour of the aborted fore legs have all been taken as distinguishing features; but he distrusts them all. Yet he speaks of the palpi as being a good distinction between *athalia* on the one hand, and *aurelia* and *parthenie* on the other. Here I am quite unable to follow him,

as the palpi of *aurelia*, though they have their own distinctions, approach much nearer to *athalia* than to *parthenie*. He also states that *parthenie*, as a rule, has not less suffusion than *athalia*; but, taking the latter species from all its localities, in some of which the suffusion is slight, yet thirty per cent. would still be more heavily marked than *parthenie*, unless in the latter *varia* is included, an inclusion which would also throw light on the question of the palpi, those of *varia* approaching more closely to *aurelia* than to *parthenie*. His comparison of the markings from the base of the fore wings of *aurelia* outwards, on the under side, to the letters G, U, R is certainly fanciful—I have rarely been able to force my imagination into seeing the resemblance—and on his own showing it breaks down as a test, since it occurs also in *athalia* and *parthenie*. It cannot, however, be too strongly insisted upon that no single test will hold good every time, and that it is only by the multiplication of small tests that we can arrive in all cases at tolerable certainty as to the parentage of a given specimen. It is for this reason that I offer no apology for the frequent use of the words “generally,” “usually,” “often,” “sometimes,” &c., which will be found in the following descriptions with somewhat wearisome iteration.

We will now proceed to these individual descriptions, in which I have employed the terms previously explained, confining myself, by way of abbreviations, to the very intelligible “up. s., un. s.” for upper and under side, and “f.w., h.w.” for fore and hind wing.

DEIONE.*—Up. s. f. w.: Border sometimes divided, showing a line of the ground colour. All the black markings are generally narrow. The inner subterminal line is almost straight in its lower two-thirds. Elbowed line continuous, and generally not very much bowed inwards. Marginal blotch often reduced to two small V marks placed thus > <, often, however, joined by a black line, or even making a small italic x placed horizontally, sometimes, however, merely a black patch. Stigma more or less oval, and filled in with the ground colour, which is a bright lightish golden brown; basal lines distinct on both sides of the median nervure. In the female the upper lunules are generally, and the ground colour between the inner subterminal and elbowed lines frequently, conspicuously lighter than the rest of the ground colour.

Up. s. h. w.: Border rather broad. Black markings generally narrow, the inner line being the thickest, the outer often very fine. Extra line complete and generally double, the discal spot being often continued above, or below, or both, into a band or part of a band. Very little basal suffusion, the basal spot being therefore inconspicuous; it has often another single or double spot of the ground colour on its inner and a band of the same on its outer side.

* These remarks refer to the French specimens; the Spanish are often nearer to var. *berisalensis*.

Un. s. f. w. : The inner edging line of the border often forms part of a series of very flattened, narrow, black or brown triangular spots. Lunules very narrow and inconspicuous. All the black markings generally narrow. Outer subterminal line inconspicuous on account of its narrowness, but broadest near the anal angle, inner only conspicuous near the costa. Elbowed line generally represented by four costal spots (the uppermost being sometimes prolonged into a dash), though sometimes distinct throughout. Marginal blotch generally only a small black streak, though sometimes V, Y, or x-shaped. Stigma and basal lines faint.

Un. s. h. w. : Inner edging line of border generally slightly angulated, often brown, and sometimes very faint. Lunules of terminal band narrow and inconspicuous; orange lunules of outer band surrounded, except towards the outer margin, more or less broadly with lighter shade. Costal part rarely less distinct than the rest. Both parts of central band of the same shade. The light spot is roughly triangular, the point resting on the fourth spot of the basal band, the central spot of which is generally small in the male, and the fifth absent.

Var. BERISALENSIS.—Up. s. f. w. : Lunules small; two light costal spots between the two subterminal lines, the inner of which is almost straight in its lower two-thirds. Elbowed line not very thick, but continuous, and not much bowed inwards; marginal blotch shaped something like a small italic *x* placed sideways, thus *æ*, or a Y placed in the same manner and opening outwards. Stigma oval and filled in with ground colour, which is much darker than in the type. Basal lines distinct on both sides of the median nervure. In the female the upper lunules are generally, and the ground colour between the inner subterminal and elbowed lines occasionally, lighter than the rest of the wing.

Up. s. h. w. : Border very broad, often nearly filling in the lunules and joining the outer line. Inner line clearly defined and rather thick. Extra line complete and clearly defined on the outside, making two distinct rows of spots of the ground colour. Basal suffusion almost confined to the lower half of the wing, so that the basal spot is not conspicuous, and often has another single or double spot of the ground colour on its inner, and the upper half of a band of the same on its outer side. The discal spot occasionally coalesces with the extra line, but usually gives the appearance of a division of this line, making an "island" of the ground colour.

Un. s. f. w. : The inner edging line of the border forms a series of eight black lunules, of which the second, third, and sixth are the most, and the seventh and eighth the least conspicuous. Outer subterminal broadest and most conspicuous towards the anal angle; inner only conspicuous on the costa. Elbowed line represented by four costal spots, of which the uppermost is sometimes prolonged into a dash. Marginal blotch generally shaped like a Y placed horizontally. Stigma and basal lines generally faint.

Un. s. h. w. : Inner edging line of border carries a row of black lunules, sometimes very small, oftener large and conspicuous. The second and generally the first spots of the outer band are only slightly

less distinct than the rest. Both parts of the central band are of the same shade. The light spot is distinctly triangular, with its point resting on the fourth spot of the basal band. The central spot of this band is generally very small, and the fifth absent.

ATHALIA.—Up. s. f. w.: Exceedingly variable in the breadth of the black lines, but the subterminals are usually rather thick and much less clearly defined than in *deione*. The inner subterminal is bowed inwards and again outwards in its lower two-thirds. This is yet more markedly the case with the elbowed line. The marginal blotch is frequently large and thick, but occasionally almost wanting. The stigma is long and narrow, and usually more or less completely filled up with black. The basal lines are usually only conspicuous above the median nervure, and the space between them is often filled more or less with black. The basal suffusion is generally of considerable extent.

Up. s. h. w.: Most of the row of lunules are generally clearly defined; when otherwise, it is due to the encroachment of the outer line rather than the border. Breadth of black lines very variable. The extra line is frequently, and the discal spot sometimes, absent, or very slightly indicated; both are often included in the basal suffusion. The basal spot is more or less circular, generally very conspicuous, and most rarely invaded by the basal suffusion.

Un. s. f. w.: Lunules normally light, but sometimes almost of the ground colour except at the costa; the two lowest spots generally approach the ground colour; sometimes one or two, sometimes a whole row of lighter spots appear inside the outer subterminal line. The inner edging line of the border is generally arched between the nervures, but has not the black lunules of *berisalsensis*. The outer subterminal line is very conspicuous at the anal angle, the inner is rarely indicated except by a few dots near the costa. The elbowed line is generally represented by three, sometimes by four, or even a whole row of spots, and by a very variable marginal blotch. The narrow stigma and upper half of basal lines are distinct.

Un. s. h. w.: Both edging lines of the border are more or less bowed between the nervures. The second and sometimes the first spot of the outer band are conspicuously less dark than the others. The inner part of the central band is always darker than the outer. The light spot is very variable in shape and size, but is rarely, if ever, of the shape of that of *deione*. The size of the central spot of the basal band is also very variable. The colour of the light bands varies in the male from silvery white to rich yellow, but in the female is always whitish.

PARTHENIE.—The fringes are rather longer and more conspicuously chequered than in *athalia*.

Up. s. f. w.: The border is sometimes divided into two very narrow dark lines, with the ground colour showing between them, as on the under side. The third lunule does not project noticeably towards the base. The inner subterminal line is sometimes only indicated, but when present, as is normally the case, it is further from the outer and nearer to the elbowed line than in any other species; it is nearly straight in its lower two-thirds.

The elbowed line, though often distinct and sometimes very broad, is occasionally only represented by its costal third, and runs into the inner subterminal; this I have never seen in *athalia*, though it occurs occasionally in *aurelia* and *britomartis*. The marginal blotch is generally small, sometimes absent. The stigma is broader than in *athalia*, circular, oval, or reniform, most rarely filled in with black, but occasionally reduced to a streak. The basal lines are fairly conspicuous above the median nervure, having often the appearance of a reniform stigma.

Up. s. h. w. : The border is sometimes divided as in the fore wing ; the inner line usually further from the outer than in other species ; when this appears not to be the case it is because the outer is unusually broad. Extra line and discal spot rarely indicated, except by a central portion of the former, which forms the outer edging of a spot attached to the exterior of the inconspicuous basal spot. Basal suffusion almost confined to the lower half of the wing, and sometimes wholly wanting. In the female, especially of the second brood, the ground colour of both wings often shows indications of the lighter and darker bands so conspicuous in the *aurima* group.

Un. s. f. w. : Inner edge of the border scarcely arched. Most of the lunules generally pale, the upper ones always so, and the ground colour between the subterminal lines generally paler than the basal portion, with at least one pale spot near the costa. Outer subterminal scarcely, if at all, more conspicuous towards the anal angle ; inner almost always visible, and often very clearly marked throughout its entire length. Elbowed line generally represented by three spots, but sometimes, especially in the second brood, traceable throughout. Marginal blotch small and pointing towards the apex. Stigma rarely well defined except in its lowest portion, and the basal lines do not extend beyond the median nervure. The basal dash often conspicuous in the male.

Un. s. h. w. : Both edging lines more or less arched, but the degree varies greatly. The two upper spots of the outer band, especially the second, are generally of more undecided pattern than the others. The inner division of the central band is darker than the outer. Inner band often ill-defined, though the light spot is generally small and narrow. The central spot of the basal band is also small. There is, generally speaking, less contrast between the bands than in the other species.

(To be continued.)

NOTES AND OBSERVATIONS.

GNOPHOS OBSCURATA VAR. MUNDATA.—I have always understood that the fine white variety, with all the markings obsolete, except the transverse lines and lunules, which Mr. Prout has named ab. *mundata*, was confined to the neighbourhood of Lewes, where it occurs rarely with the ordinary chalk form *argillacea*. I was, however, informed last year that the form *calceata* (which is the name under

which *mundata* has been sent out for years, although Staudinger gives the ground colour of his *calceata* as pale gray, while *mundata* is pure white) had been taken at Folkestone, but I cannot get any confirmation of this. It would be very interesting to hear if ab. *mundata* does occur elsewhere, and if so, in what proportion to the chalk type (*argillacea*).—A. J. WIGHTMAN; Ailsa Craig, Fowes.

LYCÆNA ARION PUPÆ.—Mr. Percy Richards, in a note dated July 24th, mentions that he found three other pupæ under one stone, and in exactly the same position as those previously reported (*antea*, p. 204); that is, in little earthen cells. He adds that only one butterfly emerged, and that this was slightly deformed.

LATE EMERGENCE OF AGRION PUELLA.—On my return from a week-end last Tuesday, I found that a female *Agrion puella* had emerged in the interim. I was away from August 15th to 18th. This date seems to be a very late one for emergence of this dragonfly.—HAROLD HODGE; Chapel Place Mansion, 322, Oxford Street, W.

THE APHIS-EATING CADDIS-FLY.—I have waited with considerable interest, not to say curiosity, for Mr. Arkle to respond to the invitation of Dr. Chapman to tell us the name of this aphis-eating caddis-fly, and to give us a description of its mouth-parts by which it performs this extraordinary feat; for it would be an extraordinary feat for a caddis-fly, as it is well known that the Trichoptera take no *solid* food in the adult state, their mandibles being obsolete. In some genera the proboscis is well developed, and may quite likely be used for sucking sweet fluids. The probability is that Mr. Arkle mistook a Neuropteran, or possibly one of the Mecoptera (*Panaspidae*), for a caddis-fly—most probably the former, as it is to this order that the aphis-lion belongs. This aphis-lion is the larva of *Chrysopa*; it destroys large quantities of aphides, and as the mouth-parts of the imago are free, with mandibles well developed, it is quite likely that they may also have a penchant for those enemies of the rose-grower.—CAMPBELL-TAYLOR; 7, Wellesley Road, Gt. Yarmouth, August 24th, 1908.

SPARROWS AS MOTH CATCHERS.—In view of the special interest which attaches to actual records of the observation of attacks on Lepidoptera by birds, I am induced to put together these few notes relating to a period covering some thirty-seven or thirty-eight years. In 1870 or 1871 the leopard moth was extremely common on the tree-trunks in the squares and parks of London. My mother, who was always keenly interested in collecting for me, boxed numerous specimens from Gordon, Euston, and other squares. She reported more than once that she had seen detached wings of the moth lying on the ground at the foot of the trees, but had never been able to ascertain what had attacked the insect. This observation was published by me about the date mentioned, with the conjecture that the enemy would most probably be found to be the sparrow. This has since been confirmed by my cousin, Mr. J. A. Finzi, who informs me that he has repeatedly seen the sparrow at work in Regent's Park,

the birds actually climbing the trunk and devouring the body of the moth while the wings were allowed to fall to the ground. So far as concerns the sparrow, it is evident that *Z. aestivus* is not a "protected" species, although the type of pattern and the leathery texture of the wings of this moth would suggest that, as regards insect foes as a whole, it enjoys more or less immunity from attack. The latest observation is due to my colleague, Professor B. G. Coker, who informed me last spring that, sitting in his study at Chingford, he heard one morning a fluttering on the window, and a greater commotion outside. Thinking a moth was in the room, and wishing to secure the specimen for me, he went to the window and found a moth flying up and down on the window-pane between the glass and the inside blind, which was drawn down at the time. The commotion outside was caused by sparrows, a number of which were flying at the window, and trying to get at the moth protected from them by the glass. Prof. Coker boxed the moth and brought it to me, and it proved to be *Plusia gamma*. Had the moth been outside the window instead of within its fate can be imagined.—R. MELBOLA; Craig View, Portpatrick, Galloway, N.B., August 21st, 1908.

GYNANDROUS AGROTIS PUTA.—It may interest some of your readers to record that I took a singularly perfect gynandromorphous specimen of *Agrotis puta* at sugar on the Deal sandhills last night—left side male, right side female. The antennæ correspond with the wings, that on the left side being pectinated as in the normal male. From a superficial examination with an ordinary hand-lens, I should say that the genitalia of both sexes are present. The anal extremity presents a curious appearance, as there is a distinct trace of the male anal tuft on the left side, while the female ovipositor protrudes to the right. The female side is very dark, and this gives the insect a striking appearance, contrasting very strongly with the light male side.—P. A. CARDEW (Capt. R.A.); St. Aldwicks, Park Avenue, Dover, August 25th, 1908.

THE ENTOMOLOGICAL CLUB.—A meeting was held, on May 12th, 1908, at Stanhope, The Crescent, Croydon, Mr. T. W. Hall, F.E.S., in the chair. Mr. H. Rowland-Brown, M.A., F.H.S., nominated at the previous meeting, was elected a member of the Club.

CAPTURES AND FIELD REPORTS.

COLIAS HYALE IN SOUTH DEVON.—On August 4th I saw a specimen of *C. hyale* on the coast near Dawlish.—(Rev.) J. E. TARBAT; Fareham, Hants.

COLIAS EDUSA IN ESSEX.—On August 7th I saw about a dozen *Colias edusa* flying over lucerne fields at Wallasea, Essex. I captured one male, and one female which has the marginal spots almost absent. She laid a few ova on the 9th, but none during the following week, although fine sunny weather continued; but on the 16th she again

laid about three dozen, and about six dozen on the 17th; the two following days being sunless she has not moved.—F. W. FROHAWK August 19th, 1908.

COLIAS EDUSA IN SURREY.—I captured a fine male specimen at Box Hill on August 8th last.—R. SOUTH.

COLIAS EDUSA, &c., AT SWANAGE.—At Kingston (four miles from here) *Colias edusa* seems fairly plentiful this year; after fifteen minutes' sprinting, two weeks back, I secured a splendid specimen, but the others evaded me, and I find that if you miss once, they don't give one a chance for a second shot. Took two specimens of *Smerinthus populi*, which came to light; this is the first time I have seen this insect here. *Pyrameis cardui* is in abundance here this year, as also are *Vanessa atalanta* and *Argynnis aglaia*.—LEONARD TATCHELL; Karenza, King's Road, Swanage, August 27th, 1908.

COLIAS EDUSA IN SUSSEX.—As this insect has not been common in this neighbourhood for some years, I thought it might be interesting to record that about twenty specimens have been taken by myself and friends this season, of which the first was obtained on July 15th last. Surely rather an unusual date for this species?—GUY E. H. PESKETT; Simla, Preston, Brighton, August 25th, 1908.

I noticed on Monday, August 3rd, on the Willingdon Golf Links, near Eastbourne, a male *Colias edusa*. It was flying low, and seemed to be in perfect condition.—HAROLD HODGE; Chapel Place Mansion, 322, Oxford Street, W., August 20th, 1908.

This has not been what might be termed a "*Colias* year," but I found *Colias edusa* more plentiful this year on the Sussex Downs than either last year or the year before. August 16th and 17th were brilliant days, and the collecting-ground chosen was a sheltered hill-side facing south, where the full heat of the sun could be felt, and with a clover field in immediate proximity. On August 16th I netted six specimens between 1 p.m. and 2.30 p.m., and on August 17th I added four more specimens, taken between 11 a.m. and 12.30 p.m. Of the ten specimens, eight were males and two females, and they appear all to be newly emerged, but three are slightly chipped. Perhaps other readers will be good enough to relate their this year's experience with *Colias edusa*.—R. T. BAUMANN; "Normanhurst," Chingford, Essex, August 27th, 1908.

COLIAS EDUSA NEAR NORWICH.—To-day, whilst out collecting, I saw a specimen of *C. edusa* flying along a field which had just been cleared of wheat.—R. LADDIMAN; 25, Drayton Road, Norwich, August 26th, 1908.

ACHERONTIA ATROPOS IN NORFOLK.—Whilst at Ranworth on the 20th of this month I had the good fortune to obtain a larva of *A. atropos*, which had been dug up in a potato field. This changed to a fine pupa on the 26th.—R. LADDIMAN.

ACHERONTIA ATROPOS IN KENT.—I have heard of several larvæ of this species in the Isle of Sheppy, and an imago was taken last week on board the battleship 'Magnificent' off Margate.—J. J. JACOBS; Gillingham, Kent, August 15th, 1908.

PLUSIA MONETA IN THE PETERBOROUGH DISTRICT.—In answer to Mr. G. T. Nichol's query, it may interest him to know that on July 29th, 1904, I captured one specimen of *P. moneta* at light at Uppingham, Rutland. In North Cambridgeshire Mr. J. C. F. Fryer, of Chatteris, has never found it, but on July 27th of this year I took a specimen at Little Shelford, and I believe the species has been previously recorded not infrequently in South Cambridgeshire.—C. E. RAVEN; 7, Durham Terrace, London, W.

PLUSIA MONETA IN NORTHAMPTONSHIRE.—Referring to Mr. G. T. Nichols's note in the August 'Entomologist' on the occurrence of *Plusia moneta* in Peterborough, it may interest your readers to know that the species was fairly common this year in my garden, where I secured both larvæ and imagines. The cocoons were also fairly numerous this year in the garden at Tring Park.—N. CHARLES ROTHSCHILD; Ashton Wold, Oundle, Northants, August 11th, 1908.

SENTA MARITIMA, &c., IN SUSSEX.—In reference to Mr. Wightman's note in the August 'Entomologist,' I should like to say that I captured two fine specimens of *S. maritima* in a small reed-bed near Rye on August 3rd, 1907, and noted their capture in the Annual Report of the Hastings and St. Leonards Natural History Society. The species had not been previously recorded from the district. From the same reed-bed—some ten yards wide and forty yards long, and quite isolated—I have also taken *L. straminea*, *C. phragmitidis*, and *N. genivipuncta*.—C. E. RAVEN; 7, Durham Terrace, London, W.

COSMIA PYRALINA AT CHESTER.—On the night of August 3rd I captured, at one of the Chester electric lamps, a fine fresh specimen of *Cosmia pyralina*. This is the second record of the moth for the district, and it is curious that I should have been favoured with the first just twenty years ago (see Entom. vol. xxi. p. 318).—J. ARKLE; Chester.

CALAMIA PHRAGMITIDIS IN SUSSEX.—I find that this species has not been previously recorded as occurring in Sussex. It may be of interest therefore to say that it was found by Messrs. Jarvis, Sharp, and myself to be quite plentiful in the valley of the Cuckmere and on the Pevensey Marshes, while a few specimens were taken on the Ouse near Barcombe.—A. J. WIGHTMAN; Ailsa Craig, Lewes.

AMPHIDASYSS BETULARIA VAR. DOUBLEDAYARIA IN RUTLAND.—Those of your readers who study the distribution of this melanic form in Britain will be interested to hear that this summer I took a female in this truly rural district of Rutland. I also bred a specimen last May from a larva found on black poplar the previous September. So far I have not come across the type.—HAROLD RAYNOR; Stoke Dry Rectory, Uppingham, August 13th, 1908.

DICYCLA OO IN RICHMOND PARK, SURREY.—I took two fine specimens of *D. oo* in the park on July 11th, and saw two more examples, which I failed to capture. I understand that others have also obtained this species in the same locality. I may add that, with the exception of one specimen at light four years ago, *D. oo* has not been

met with by myself in this neighbourhood since 1896. — PERCY RICHARDS; 11, Queen's Road, Kingston Hill.

COUNTY CORRECTIONS. — There are two records in the August 'Entomologist' from Bournemouth, neither of which are geographically correct, viz. *Hyloicus pinastri*, by Mr. Reynolds, at Branksome Park, Bournemouth, and *Deilephila euphorbie*, by Mr. W. G. Hooker, at Canford Cliffs, Bournemouth. Bournemouth is in Hants, whilst Branksome Park and Canford Cliffs are both in Poole, and geographically in Dorset; the capture of the *D. euphorbie* having taken place at least one and a half miles inside the Dorset border. — W. PARKINSON CURTIS; Aysgarth, Poole, August 12th, 1908.

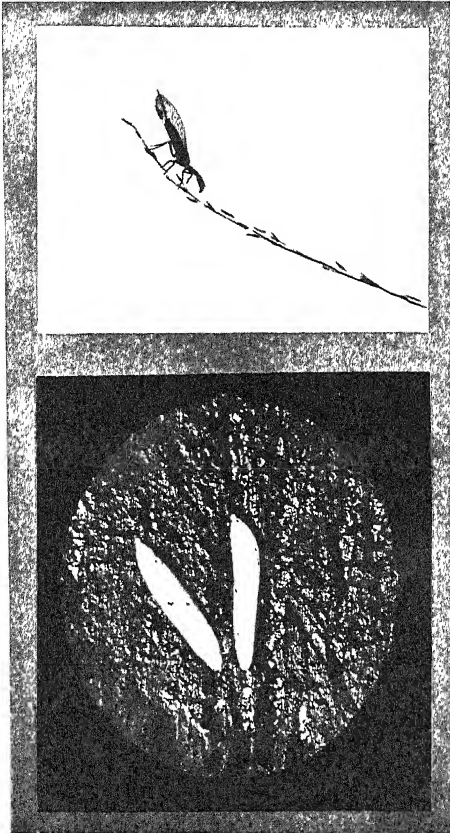
RECENT LITERATURE.

Transactions of the City of London Entomological and Natural History Society for the year 1907. Published by the Society at the London Institution, Finsbury Circus, E.C.

As we have noted in previous years when referring to this publication, the items appearing under "Reports of Meetings" (pp. 4-12) are interesting and instructive. The papers comprised in the volume, four in number, will be found most helpful to all who are in any way studying the subjects upon which they respectively treat. "The Variation of *Entephria cæsiata*" (pp. 21-32), by Mr. Prout, is exceedingly valuable. Dr. Hodgson, in "Notes on *A. bellargus*, with references to Allied Species" (pp. 42-47), presents some interesting statistics. "Notes on the Wainscots" (pp. 32-40), by Mr. Edleston, deals chiefly with the life-history of some of the fen species in the group. Accompanying Mr. Cockayne's "Notes from North Sutherland" (pp. 33-39) is a plate of photos of some varieties of moths he obtained in that remote corner of Scotland. In the Presidential Address, Mr. Mera remarks, among other matters, upon the varying effect of cold and dull weather on Lepidoptera reared in confinement.

The Senses of Insects. By AUGUSTE FOREL. Translated by MACLEOD YEARSLEY, F.R.C.S. Pp. i-xvi and 1-324. With two Plates. London: Methuen & Co.

THOSE who have been unable to acquire or to study Forel's admirable work in the original will be grateful to the translator and publisher for the opportunity of adding this inexpensive and handy volume to their library. The subject-matter, originally published in five parts, at intervals of time, is here arranged in twelve chapters, in the eleventh of which is included experiments made by Dr. Forel on memory of time and association of memories in Bees ('Comptes rendus de l'Association Française pour l'avancement des Sciences; Congrès de Lyon,' 1906).



4. Ova ($\times 20$).
3. Imago φ (nat size)
RAPHIDIA NOTATA AND ITS OVA
G T Lyle photo



1. ABRAXAS GROSSULARIATA.
2. A SYLVATA (ULMATA) var.
(W J Lucas photo)

THE ENTOMOLOGIST

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[No. 545

OVA OF *RAPHIDIA NOTATA* (NEUROPTERA).

By G. T. LYLE.

(PLATE VII.)

IN the summer of 1907 I found a female of this, the largest of the four British species of the Raphidiidæ (snake-flies), one of the families of the Planipennia. The insect was crawling on the trunk of a tree (*Pinus sylvestris*) in Perry Wood, in the New Forest. I placed the specimen in a pill-box, and took it home with the intention of photographing it. On opening the box the next day I discovered that it had deposited six eggs in the crevice between the box and the lid, thus leading one to suppose that they are normally laid in the chinks of the bark. The eggs were conical in shape, and had a very short pedestal at the thicker end. They stood erect on this, and were in contact one with another, as is the case with the eggs of *Sialis lutaria* (the alder-fly). They were white in colour, and were covered with faint reticulations. The photograph of the imago is natural size; that of the ova is magnified twenty diameters.

Brockenhurst.

JOTTINGS ON APHIDES TAKEN DURING 1907 AND 1908.

By CLAUDE MORLEY, F.E.S., &c.

(Concluded from p. 212.)

THE genus *Aphis* is a long one, and many of its species are common. *A. brassicæ*, Linn., was forming large powdery masses on the flowers of *Brassica oleracea* on June 9th, and is still abundant there; but I have seen no winged forms. At the same time last year I found a little cluster of four apterous *A. cratægi*, Kalt., on a leaf of *Cratægus oxyacantha* in Framlingham Castle moat,

and on the same leaf a winged specimen, which however must, I think, be referred to *A. pruni*. On the same plant at Bedford, early in August, *A. edentula*, Buck., was fairly common in all its forms on the terminal shoots. About one hundred *A. subterranea*, Walk., were found on the root of a carrot on August 24th; the root was distorted by them just below the surface. No winged forms were seen. Mallow has failed to produce *A. malvæ*, Fabr., but it occurred last year abundantly in my garden below the flower-heads of *Achillea millefolium* early in August, and among them was walking a remarkable black female Chalcid with flavous antennæ and hind femora, contrasting strangely with dark tibiæ; its entire length is $\frac{3}{4}$ mm. On June 1st, 1907, winged *A. mali*, Fabr., were somewhat common, with a few evacuated pupal skins, sitting on the under side of fully grown leaves of *Pyrus malus*, and on the 3rd the apterous females and larvæ were found to be abundant in their curled apple-leaves, which they discolour; larvæ of *Syrphus ribesii* (which I bred), and, later, of *Coccinella bipunctata*, appeared to have entirely demolished the whole of this species by the end of July. *A. urticae*, Kalt., was abundant in all its forms on stems of *Urtica dioica* on June 2nd, and what appears to be the same species occurred commonly on the new shoots of *Rubus fruticosus*, though only two winged specimens were seen on the latter food-plant. In rolled leaves of *Prunus spinosa*, *A. pruni*, De G., occurred commonly early in June, with a proportion of one winged to every score of apterous females. *A. atriplicis* was abundant in the salt-marshes at Southwold last September on *Statice limonium* and *Aster tripolium*. *A. hieracii* (*sic*), Kalt., was last year first seen very rarely on leaves of *Heracleum sphondylium* on June 9th; by the middle of July it was common, and at the beginning of August excessively abundant in all its stages on the stems, just below the flower, of hogweed; on July 26th, 1904, I observed a specimen of *Bassus nemoralis* investigating a brood of this Aphid in Ipswich; it walked over the flowers without being attracted by them, and closely investigated the Aphids, but did not attack them in any way;* I am able to assert that *Stigmus solskyi* certainly preys upon this Aphid, since I have seen this Fossor attack them upon the stem of a seedling plant in Ipswich on July 28th and 29th (*cf.* Saunders, 'Aculeata,' p. 90; Prof. Poulton tells me he has further confirmation of the fact). A single plant of *Epilobium hirsutum*, among many, produced a dozen larvæ and one of both forms of the female of *A. epilobii*, Kalt., in the middle of August. *A. hederæ*, Kalt., first called my attention to this group of insects by crowding the shoots of *Hedera helix* cluster-

* We have yet much to learn concerning the parasitism of the *Schizodontes* upon aphidivorous Syrphid flies, for which no doubt both this specimen and the *Bassus tarsatorius* mentioned above searched among the Aphids (*cf.* Trans. Ent. Soc. Lond. 1905, pp. 419-438).

ing round the house-windows; it is quite indifferent to light, and attacks with equal voracity sickly ivy-shoots in dark places; *Lasius niger* is much attracted by it. Local guelder rose appears exempt from *A. viburni*, Schr., which was abundant on *V. opulus* in Mr. Morey's garden at Newport, Isle of Wight, at the end of June, 1907. *A. rumicis*, Linn., is one of our commonest kinds here, and bewilderingly omnivorous; I first took the winged form singly in only half-uncurled apical leaves of *Rumex acetosa*; all its forms were a pest to broad beans throughout last summer, and flew abundantly into one's eyes during the flowering season. Early in August it was common on *Cnicus arvensis*, formed black masses on some of the stalks of *Petasites officinalis*, swarmed on beet-plants, and a few females and pupæ occurred on *Hieracium*; I also took it at Norton Wood, Isle of Wight, on June 20th, and received it from Fulham (London) in September. Thirteen of the distinct larvæ of *A. papaveris*, Fabr., were clustered together on the under side of a leaf of *Papaver rhæas* on July 30th, 1907, and three winged forms found on the same plant on June 8th may be identical. All the forms of *A. pyri*, Fonsc., were abundant in the curled leaves of *Pyrus communis* early in June. I have been quite unable to discover the common *A. jacobæ*, Schr., *A. laburni*, Kalt., and *A. sambuci*, Linn., upon their respective food-plants, though diligently searched; nor have I detected any of the half-dozen *Hyalopteri*, except *H. arundinis*, which was so abundant on all the reeds in salt-marshes about Southwold as to render the sweep-net quite heavy; among them I detected *Coccinella 11-punctata* and great numbers of *Bassus latorius*, both apparently ovipositing.

At the end of May *Chaitophorus aceris*, Linn., is abundant beneath the leaves of *Acer campestre*, in all its forms, mingling later with *Drepanosiphum*. Buckton says the alate *C. salicivorus*, Walk., is unknown in Britain, but on August 2nd last I succeeded in securing three examples of it among myriads of the apterous form scattered all over the under side of leaves of *Salix caprea*; one of the winged specimens was dead when found, though not parasitized. The common form was also seen at Southwold in September. In the middle of August *C. leucomelas*, Koch, is not uncommon in its curious flavous dome-shaped blisters both on the upper and lower sides of the leaves of *Populus tremula* at Monks Soham and Easton Park. The winged form of *Callipterus betulicola*, Kalt., was excessively abundant on small birch-bushes in Tuddenham Fen, Suffolk, on May 6th. *C. coryli*, Goet., occurred commonly, though singly and sparsely scattered over the under side of hazel-leaves here early in last August; the apterous form was then much the rarer. Two winged females and four pupæ only had been previously taken on June 4th. It was also common at Easton Park in the middle of August, together with *C. quercus*, which I first found on oak-

leaves in my garden on June 4th, 1907, since which time it has been common singly, but much scarcer in the apterous condition. On August 27th, 1906, I swept the distinct *C. castaneæ*, Buck., from rough heath-grass in Tuddenham Fen; it was quite common there, and I brought home seven winged and nine apterous females. On the under side of (usually young) leaves of *Alnus glutinosus* near Easton Park, on August 17th last, winged *Pterocallis alni*, Fabr., were not rare, though only one apterous imago and but few larvæ were seen.* *P. tiliaæ*, Linn., I have twice captured flying in July in Suffolk, at Ipswich and Kessingland. Here the winged form is solitarily abundant on the under side leaves of *Tilia platyphyllos*; comparatively few appear to be "stung," and all the apterous forms are very scarce. The only *P. juglandicola* I have met with was on the leaf of a walnut-tree at Sibton Abbey, Suffolk, last September. *Phyllaphis fagi*, Linn., was in both years abundant in all its forms beneath the leaves of both old and young *Fagus sylvatica* at the beginning of June; in late July I could find none, though I had noticed no foes of any kind.

It appears conjectural whether the Lachnides group of the Aphidinae should include the two last-named genera, as ranged by Buckton, since the apical antennal joint is almost identical in *Callipterus*, and the elongate legs of *Lachnus* are not represented. Of this genus, the presumably rare *L. agilis*, Kalt., is commonly beaten from *Pinus sylvestris* in the middle of August here, though but three winged forms have been seen. Many winged *L. macrocephalus*, Buck., were beaten from *Picea excelsa* at Foxhall, near Ipswich, on July 4th, 1904; and Kirby and Spence say (Introd. 7th ed. p. 185) that *L. pini*, Linn., used to be common in Mr. Sheppard's garden (he was curate at Nacton in the same neighbourhood, 1804-7). I have captured winged *L. pinicolus*, Kalt., in Bentley Woods, July 26th, 1897, and Easton Broad, Suffolk, June 3rd, 1905; at Wilverley, in the New Forest, and Parkhurst Forest, Isle of Wight, in June, 1907; and in the middle of August I have beaten the apterous form abundantly from Scotch fir in my garden, where were no winged individuals. Three hibernating females of *L. viminalis*, Fonsc., were found beneath the bark of *Salix alba* by the Gipping at Ipswich during the winter of 1894-5. Kirby says (Introd. 7th ed. p. 336) that he has taken *Trama troglodytes*, Heyd. = *Aphis radicum*, in the nest of *Lasius flavus*—most probably at Barham. What I believe to be the undescribed (by Buckton) winged female of *Dryobius*

* Buckton did not describe from living specimens. When alive winged *P. alni* are pale yellow, with the apex of the scutellum and two indeterminate transverse abdominal bands distinctly green; the nectaries are entirely, and the tarsi apically, black; the stigma of the wing is transparent, with its base and apex clouded; and the basal transverse nervure of the upper wing is much darker and more conspicuous than the remaining veins.

roboris, Linn., was swept by Mr. Elliott and me in Parkhurst Forest and the Haven Street Woods, in the Isle of Wight, in June, beneath oaks in 1907; it is a beautiful insect, with black wings bearing an interrupted oblique apical line, a central band extending transversely across the disc, and the whole basal area, transparent; the apterous form occurred with it.

Of the Schizoneurinae, *Schizoneura lanigera*, Hausm., is only too common here and at Brandon, in North-west Suffolk, on the bark of *Pyrus malus*; I have, however, seen none winged. Apterous *S. fuliginosa*, Buck., are equally abundant in downy masses, one behind the other, on the pinnules of *Pinus sylvestris*, last August; the earliest winged ones were seen on the 22nd. At the end of June, 1907, I took *S. ulmi*, Linn., in all its forms in rolled and blighted leaves of elm in Mr. Morey's paddock at Newport, Isle of Wight, though a diligent search has failed to reveal it here. Perhaps the ubiquitous *S. corni*, Fabr., was the species said by Kirby to have occurred in incredible numbers in Ipswich in 1814; it is, at all events, often abundant there at Wherstead (October 29th, 1903), and Barren Heath (September 15th, 1904); the first one last year was noticed on August 22nd, and it occurred at Reydon, Suffolk, in September. I have seen no apterous forms, nor have I observed it upon *Cornus sanguinea*. I hope to do more with the three remaining small subfamilies anon. At present I can only mention *Chermes laricis*, Htg., of which I found eggs, larvæ, and winged females abundantly on young *Pinus larix*, together with a large dead oviparous female and a Coccinellid larva, at Foxhall Plateau at the end of May, 1907; it also is common on old larches in my garden here. Of the rest, I believe that the apterous pale Aphid taken by Mr. Chitty and me at Brandon, in the nest of *Tetramorium cæspitum* early in May last year, is *Forda formicaria*, Heyd.

Monks Soham House, Suffolk: August 1st, 1908.

DESCRIPTIONS OF TWO SPECIES OF EVANIA FROM BORNEO.

By P. CAMERON.

Evania kuchingensis, sp. nov.

Entirely black; the wings almost hyaline, the nervures black, the head, pro- and mesothorax covered with silvery pubescence. Face closely, finely, distinctly punctured, the front and vertex shining, finely punctured, but not so closely as the face; there is a shallow furrow outside the raised inner orbits. Eyes with a distinct greenish colour, very slightly converging above; the malar space long, half their length. Ocelli in a curve, the hinder separated from each other

by a distinctly greater distance than they are from the eyes. Palpi black. Scape and pedicle of antennæ as long as the fourth joint, which is about one-fourth shorter than the third. Prothorax finely, closely punctured, the lower half of the propleuræ irregularly striated, the striæ almost forming reticulation. Middle lobe of mesonotum irregularly, somewhat strongly punctured, the punctures clearly separated and more numerous on the sides than on the centre; the lateral lobes very minutely punctured, the base on the outer side with two outer and four inner foveæ, the apical half along the sides furrowed. Scutellum, except in the centre, more strongly and closely punctured than the mesonotum. Upper basal half of mesopleuræ smooth; the rest with round clearly separated punctures; the apex with a row of oblique stout striæ. Metathorax closely reticulated. Hind tibiæ and tarsi finely spinose; the long spur of hind tibiæ about one-fourth of the length of metatarsus. Metasternal forks strongly diverging, longish, stout. Apex of claws cleft; the lower branch thicker than upper. ♂. Length, 7 mm.

Kuching, Borneo (John Hewitt).

The coxæ and trochanters are covered with a silvery pile. The recurrent nervure is received beyond the transverse cubital. Abdominal petiole smooth and shining, the sides pubescent; the rest of the abdomen very smooth, bare, and shining.

Evania Hewittii, sp. nov.

Black; the antennal scape and the basal joints of the flagellum below and the fore tibiæ testaceous, the wings hyaline, the nervures black, the face and malar space somewhat strongly, closely striated, metasternal fork stout, straight, obliquely diverging; hinder tibiæ not spined; the long spur of the hinder tibiæ about one-fourth of the length of the metatarsus. Abdominal petiole in the middle closely but not strongly striated. ♂. Length, 3.5 mm.

Quop, October (John Hewitt).

Apex of mandibles rufo-testaceous, the palpi testaceous, third antennal joint as long as the scape and as long as the fourth. Temples smooth and shining. Malar space about two-thirds of the length of the eyes. Mesonotum sparsely, the scutellum more closely and strongly punctured. Metanotum at the base with round, moderately deep punctures, and moderately close together; the rest of the metathorax closely reticulated, except for a smooth triangular space below the wings. Mesopleuræ smooth and shining above, the lower part slightly dilated and sparsely punctured. Abdominal petiole two-thirds of the length of the rest of the abdomen. Radial cellule wide, the apical and basal abscissæ of the radius curved; the transverse basal and the recurrent nervures interstitial. The sides of the front are striated, its centre and the vertex smooth. Hinder ocelli separated from each other by a distinctly greater distance than they are from the eyes. Parapsidal furrows deep, curved. Head and thorax sparsely covered with short white pubescence, as are also the legs. Hinder coxæ smooth, depressed and shining at the base, the rest opaque, somewhat strongly, irregularly punctured.

NOTES ON SOME ANDALUSIAN BUTTERFLIES.

By W. G. SHELDON, F.E.S.

(Concluded from p. 218.)

THERE are several walks one can take on the Alhambra hill that afford good collecting; perhaps the best is reached by proceeding along the road past the 'Washington Irving' as far as the cemetery; skirting round this, taking the left-hand side, until you come to the far end, then taking a diagonal course down the slopes towards the river Genil until you get to the upper edge of the cultivated ground, and then walk up its valley for a mile or more, at the junction of the cultivated with the uncultivated ground. Another good locality is reached by taking the road to the left, about half-way between the 'Washington Irving' and the cemetery, and following it for some two miles until you come to a plateau overlooking the gorge of the Darro; no one should miss reaching this spot for the sake of the view alone, which is truly superb: the plateau, which is thickly overgrown with *Cistus*, *Ilex*, *Cytisus*, *Dorycnium*, and other kindred plants, extends for several miles, the whole of which is very good ground. This plateau can also be reached by taking the road last described and diverging from it a few hundred yards after you enter it from the 'Washington Irving' road, at the first gorge that passes alongside it on the left. By crossing this gorge, and bearing up the hillside at the back of the Generalife Gardens and Palace, you come to the ridge of the Darro gorge, and by following this until you get to the plateau you find not infrequently *Papilio* var. *feisthamelii*, the only locality I could meet with it at Granada.

The morning of May 8th broke fine and cloudless, and when I reached the far end of the cemetery, soon after 8 o'clock, I was evidently not too early, for things were flying briskly. As I dropped down the slope *Polyommatus baton* var. *panoptes* was the first insect netted; it was in numbers and good condition. Swift-winged *Colias edusa* and the whites flew wildly to and fro; one did not stand much chance on these slopes of catching any! *Chrysophanus phloas*, evidently reared under cold conditions, and showing no approach to ab. *eleus*, was in swarms. *Melanargia ines* again, not in such numbers as at Malaga, but in the pink of condition, took up my time till after 9 o'clock, but to my surprise there were no signs of *Zegris eupheme* var. *meridionalis*, which was the chief entomological reason for my visit to Granada, and which I had been led to expect on these slopes. I decided therefore to move on further up the Genil valley; in doing so I crossed several small ravines, down the bottom of which in winter evidently ran a stream; in these the fine Spanish form of *Melitæa deione* was in some

numbers, the females measuring over 50 mm. across the wings ; with them were *M. phæbe* var. *occitunica*, easily recognized on the wing by its more powerful flight. Eventually, coming in my direction, I saw, about 10 o'clock, a yellowish white butterfly, which I knew could only be the much-desired Granada speciality ; this I managed to net, but to my great disappointment it was worn to rags. Mr. Tylecote had found *Z. var. meridionalis* just coming out at the end of April, 1904, and yet only ten days' later in the year I now found that I was too late for it at its best. However, having found one specimen I soon came across more, and by noon had netted seventeen, of which only nine were cabinet specimens. The next day I tried the Genil valley again, taking much the same species as on my first visit, and netting sixteen *Z. var. meridionalis*, of which only seven were of any use. May 10th I tried higher ground on the way to the before-mentioned plateau, and here I found a spot which contained some good *Z. var. meridionalis* and captured ten good specimens. On the 11th I again visited this spot, but only obtained three, and, except for single females on the 13th and 15th May, I did not again see the species. It seems evident, from my experience, that the best time at Granada for this elusive insect is the first week in May, and that it is only a very short time on the wing.

Z. var. meridionalis at Granada chiefly haunts patches that have not been cultivated for a year or so, thus allowing a luxuriant growth of a yellow crucifer which is very like *Sinapis arvensis*. I saw females depositing ova on this plant, and fed a larva on it for several days until I left Granada. After this I found it would eat the flowers of any yellow crucifer I could find. This larva survived until it reached the third stage, and was then light pea-green in colour with a black head, and the segments thickly covered with small black spots. The ovum is of the usual Pierid shape ; when first deposited amongst the flower-buds of its food-plant it is light green, changing in a day or so to orange.

The males have a swift steady flight, and are not particularly difficult to capture. They are easily distinguished from the numerous Pierids amongst which they fly by their yellowish tint ; the females, which fly much more slowly, in consequence of the less amount of yellow are much more difficult to distinguish.

On the first occasion I visited the plateau overlooking the Darro gorge I found, on the way up, in addition to *Z. var. meridionalis*, *Pyrgus sao* frequently, apparently the Central European form, and showing no approach to the var. *therapne*, which is said to be the form occurring in Andalusia, and which I had taken in Corsica in 1906. In the small gorge to the left of the road *Euchloë euphonides* was abundant and in fine condition. The Andalusian *E. euphonides* interested me greatly ;

it will be remembered that, until lately, *E. euphonides* was considered to be a form of *E. eupheno*, the nearly allied species found on the African side of the Mediterranean. Considering that the known distribution of *E. euphonides* is, according to Staudinger, Spain and Portugal, Southern France and Italy, and that *E. eupheno* occurs all along the African shores of the Mediterranean, it would seem a fair inference that either Africa received its species from across the Straits of Gibraltar, or *vice versa*; and, bearing in mind the similar climate on both sides of the Straits, that the form found in Andalusia would be intermediate between those occurring in France and Morocco. This is, however, not the case. I cannot see in any Andalusian examples collected at Algeciras, Ronda, and Granada, the slightest tendency towards *E. eupheno*; the males are practically identical with my French specimens; the females, however, differ considerably, but not in the direction of *E. eupheno*. The French females have the tips of the superiors of a brilliant orange colour, through which the greyish black suffusion of the veins shows prominently. In the Andalusian females this orange is much less pronounced in quantity and brightness, and in one of my specimens it is almost entirely absent, consequently the suffused veins show up much more and give the impression of a grey tip.

The Andalusian seems also a much smaller insect than the French, my largest examples measuring only 41 mm., whereas some of those from France exceed 48 mm. in expanse.

Another insect that did not turn out in accordance with my anticipations was *Aglais urticæ*; I had observed one or two specimens a few years ago in Arragon, which appeared to me to resemble in depth of ground colour the Corsican var. *ichnusa*. The Granada *A. urticæ*, which were not uncommon on the plateau, sucking the flowers of a white *cistus*, did not show any approach to these, and, apart from the somewhat wider tawny margin to the hind wings, might have been typical British specimens.

On the plateau itself I came across several species I had not previously seen in Spain, amongst which was *Melanargia syllius*, with somewhat stronger black markings than my Hyères specimens; the fine black Spanish form of *Nisoniades tages* var. *Cervantes* was abundant, looking like a small *Erebia* whilst flying; *Anthocharis tagis* was also taken at the edge of the Darro gorge, and was in very fine condition considering the late date; a single female of *Aporia crataegi*, the only one I saw in Spain, had doubtless been blown up from the lower slopes of the gorge. *Zygæna lavandulæ*, a very distinct form, with only a small round red spot on the inferiors, boomed along in the sun in fair numbers; fine large *Nomiades melanops*, some of which exceeded 35 mm. in wing expanse, flitted round the *Dorycnium* plants.

Just where the road enters the plateau is a rather prominent knoll, around which each day about noon would be found flying one or more *Papilio feisthamelii* and several *P. machaon*; these latter were, however, quite safe from my best efforts. Here also I netted the only *Anthocharis belemia* var. *glauce* I saw at Granada, some three or four in number.

On May 13th I saw several dark Satyrid-looking butterflies on the slopes by the Genil, and after some trouble succeeded in netting one. My surprise was great to find that I had captured a male *Hipparchia semele*, considering that *H. semele* is not found until well on in July in such hot places as Corté in Corsica, and that it is found in England at the same date; it was unexpected to find it in Andalusia two months earlier, and at a height of more than 2000 ft. above sea-level; one wonders if it manages to get in a second brood there. Almost an equal surprise on May 15th was to net a fine example of *Thymelicus lineola*.

I had intended making certain excursions in the Sierra Nevada whilst staying at Granada, but the abnormal heat had so affected the ladies of the party I could not manage to do so, and unfortunately we had for this reason to shorten our stay at Granada and move to cooler quarters on the Bay of Biscay; accordingly we left Andalusia on the 18th of May. This was a disappointment, because not only are certain local species said to appear at Granada during the last few days of May, but it was most tantalizing to see the slopes of the Sierra Nevada so near and yet not be able to explore them. No doubt very good work could be done in them in June and July, but I understand accommodation of any kind is very difficult to get, and probably for a successful expedition tents and servants would be a necessity.

Youlgreave, South Croydon: July 10th, 1908.

ON THREE UNDESCRIBED FOSSORIAL HYMENOPTERA (*CRABRO* AND *PSEN*) FROM BORNEO.

By P. CAMERON.

Crabro hewittii, sp. nov.

Black; antennal scape, clypeus, mandibles, palpi, the entire head below the eyes, the collar broadly, a slightly narrower band on the lower part of the propleuræ, prosternum, scutellum, a narrow line on the post-scutellum, and the legs, except the hind coxæ and almost the apical half of the hind tibiæ, bright lemon-yellow; the sides of the basal abdominal segments brownish. Wings hyaline, the stigma fuscous, the nervures blackish. Antennal flagellum fulvous. ♀. Length. 4 mm.

Kuching (John Hewitt).

Clypeus densely covered with silvery pubescence, its centre keeled, the apex of the keel projecting into a blunt tooth. Front minutely punctured, the vertex almost smooth; the ocelli in a triangle, the hinder separated from each other by about the same distance as they are from the eyes. Mesothorax very minutely punctured. Base of metanotum irregularly striated, its centre furrowed. First abdominal segment longer than the second, longish, its base not half the width of the apex.

Crabro dentipleuris, sp. nov.

Black; antennal scape, a line on apex of pronotum, tubercles, and scutellum yellow, the fore tibiæ and tarsi testaceous, the base of the hind tibiæ narrowly, and the calcaria and the hind metatarsus to near the apex pale yellow. Wings hyaline, the nervures black. The centre of the lower edge of the propleuræ with a stout triangular tooth, behind which is a rounded tubercle. ♀. Length, 5 mm.

Kuching (John Hewitt).

Eyes distinctly converging below. Apex of clypeus broadly rounded, its centre keeled. Apical half of mandibles rufous. Front closely, distinctly punctured, the vertex almost smooth. Ocelli in a triangle, the hinder separated from each other by about the same distance as they are from the eyes. Mesonotum and scutellum closely, minutely punctured. The whole metathorax smooth and shining, the base with a short distinct furrow; the apical slope with a wide depression. Propleuræ almost smooth, the mesopleuræ closely punctured. First abdominal segment clearly longer than it is wide at the apex, the base not quite half the width of the apex. Palpi fuscous. The body is covered with a short silvery pubescence.

Should be known by the stout, triangular, pleural tooth.

Psen marginicollis, sp. nov.

Black; the antennal scape, the four anterior tibiæ and tarsi, and the tubercles dark testaceous; the wings hyaline, the stigma and nervures black. Head smooth and shining, the eye orbits with a crenulated border, bounded on the outer side by a distinct keel. Front furrowed down the centre. Ocelli in a triangle, placed behind the eyes, the hinder separated from each other by a less distance than they are from the eyes. Temples broad. Occiput transverse, distinctly margined. Apical half of pronotum raised, the base of the raised part margined, projecting laterally into teeth. Mesonotum almost smooth, its apex with a distinct crenulated furrow, behind the centre of which is a triangular depression. The entire metathorax is coarsely reticulated. Pro- and mesopleuræ opaque. The narrowed basal part of the first abdominal segment is opaque, curved, fully one-half longer than the dilated apex. The central part of the propleuræ is raised, and it is surrounded above, below and at the apex by a striated furrow; the central part of the mesopleuræ is also surrounded by a striated furrow, the lower and upper of which unite at the apex. Length, 4 mm. ♀.

Kuching (Hewitt).

THE *ATHALIA* GROUP OF THE GENUS *MELITÆA*.

BY GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 227.)

VARIA.—The two sexes differ so completely that it will be necessary to treat them separately.

♂. Up. s. f. w.: Lunules for the most part replaced by quadrate spots, the third from the bottom not usually projecting at all beyond the rest towards the base. Ground colour of both wings decidedly darker than the average *parthenie*. Outer subterminal line generally very distinct throughout its length, but sometimes only indicated by dots; the inner rarely present. Elbowed line varying greatly in distinctness, being sometimes thick throughout, sometimes only indicated by a few spots, dark or faint, at the costa, and by the marginal blotch; it is much less bent than in any other species. Stigma large for the size of the insect, and clear, not filled with black. Upper half of basal lines fairly, sometimes very, distinct. There is a considerable basal suffusion.

Up. s. h. w.: Outer line clearly defined, inner sometimes as clear, but oftener indistinct. At least the lower half of the extra line is usually indicated, unless enclosed in the large basal suffusion, which generally obliterates the basal spot. Discal spot rarely present unless embodied in the extra line.

Un. s. f. w.: Ground colour rather lighter than in the male of other species, but only the upper lunules and two spots within the outer subterminal line are lighter than the ground colour. Inner subterminal line rarely distinguishable, and outer subterminal and even inner edging line of border often obsolescent. Spots indicating the elbowed line usually very black and distinct, as are also the marginal blotch, stigma, and upper part of basal lines, which form a reniform stigma. Basal dash large and black, sometimes joining the marginal blotch.

Un. s. h. w.: Edging lines of border scarcely, if at all, arched. Bands very distinct. Terminal band brightish yellow, outer band almost of the ground colour of f. w. The outer portion of the central band is yellowish white, the inner portion of the same shade as the terminal band. In all the other species (except *deione* and *asteria*) the outer portion of this band is of the same shade as the terminal lunules. The third and fourth spots of the outer portion of the central band barely project beyond the others. Inner band variable in width, the light spot being generally very small or almost absent. The second spot of the basal band generally conspicuously large, and in a less degree the fourth. This band is of the colour of the outer portion of the central band.

♀. Up. s. f. w.: Ground colour of both wings somewhat lighter than that of the male, where it can be seen, but it is nearly always much suffused, and sometimes almost entirely covered with a blackish suffusion, which in fresh specimens has a marked greenish tinge. Both subterminal lines broad and distinct unless too much suffused; the inner is only slightly bowed out near the costa, and thence almost

straight. Lunules, when visible, as in the male, but sometimes reduced to tiny dots. Elbowed line generally very slightly marked, except at the costa, and by the marginal blotch. Stigma and space between the basal lines usually filled with dark scales.

Up. s. h. w.: Border and the two lines thick and suffused, and the basal suffusion often reaches the inner line, leaving only one or two rows of spots of the ground colour. No discal spot or extra line, and the basal spot is rarely visible.

Un. s. f. w.: The whole row of lunules and two costal spots within them are light. Both edging lines of the border and the outer subterminal distinct, and inner subterminal generally distinguishable. The other markings, including the costal spots of the elbowed line, generally slight or even absent, except the marginal blotch, though all are sometimes distinct.

Un. s. h. w.: As in the male, but the central and basal bands rather lighter, and sometimes silvery white. Terminal band sometimes darker, as in the male, but often of the same shade as the *outer* portion of the central band. The light spot is of the same shade, and not, as a rule, very small. The lunules of the outer band are generally small, as in *aurelia*, leaving a considerable part of the band to be filled in with dusky scales.

AURELIA.—Up. s. f. w.: The border and the two subterminal lines generally broad but sharply defined in the male, but often less broad, though more suffused in the female; the inner one is rather less bowed below the costa than in the other species, except *varia*, and generally bends slightly outwards at the inner margin. The nervures, especially the lower ones on both wings, are more broadly edged with black than in the other species, and in the male are sharply defined, giving a neat lattice-work appearance, which is blurred in the female. Elbowed line generally clear, but often consists of a series of large or small spots, the middle portion being sometimes wanting. Stigma and upper half of basal lines clearly defined, and generally enclose scales of a darker shade than the ground colour. Basal suffusion specially noticeable along the inner margin.

Up. s. h. w.: Inner line usually much broader than outer. Discal spot and extra line present, but frequently in the male and almost always in the female swallowed up in the basal suffusion. Basal spot generally visible in the male, and sometimes in the female; a second spot of the ground colour edged with black, but inside the extra line, accompanies it. Nervures broadly black, as in the fore wing. On both wings the border is often split up, especially in the female, into two narrow dark lines containing a line of the ground colour.

Un. s. f. w.: Lunules light at the costa, and sometimes down to the anal angle; outer subterminal clearly defined and generally quite dark, often with a whole row of light spots indicated within it, those near the costa being very conspicuous. The spots near the costa representing the elbowed line are not infrequently *rings*. Outlines of the stigma and the basal lines generally distinct, as are the marginal blotch and basal dash, but less so in the female than in the male.

Un. s. h. w.: Inner edging line of the border only very slightly arched; the border itself darker than the lunules. The separation of

the terminal and outer bands in the female is often very indistinct, and the latter is much lighter than is usual in other species. In both sexes the lunular portion of the outer band is very narrow, not occupying much more than half the band. The inner part of the central band is darker than the outer; the proportion between these divisions varies greatly. Fifth spot of basal band usually present; light spot generally rather small.

BRITOMARTIS.—The two broods differ greatly in size, the second being very much the smaller, though a large specimen of the second may closely approach in size a small specimen of the same sex of the first. Both broods are *very* variable in the breadth and distinctness of the markings of the upper side. The outer margin of the fore wing is generally conspicuously angular about a third of the way down.

Up. s. f. w.: The black border has a tendency to divide and show a line or a series of spots or dashes of the ground colour. Lunules generally distinct but narrow, the lowest, especially in males of the first brood, being sometimes suppressed. The tendency of the first brood seems to be to have the outer subterminal line broader, of the second narrower than the inner; both are generally distinct and fairly broad, though sometimes the inner one especially is blurred. This latter approaches most nearly in shape to that of *aurelia*, but it is on the whole the straightest of the group, owing to the slightness of its costal bend. Elbowed line, except in specimens where the whole surface is blurred, generally broad and distinct, with a broad thick marginal blotch, which in the female sometimes contains a double line thus \asymp , almost of the shape of the characteristic blotch of *berisalensis*, but of the ground colour instead of black. Sometimes the whole black marginal blotch is of this form, *e.g.* in the co-type in the South Kensington Museum. The stigma is much like that of *athalia*, but not filled up with black except in males of the first brood, though in the females of this brood, and occasionally in both sexes of the second, it contains a number of dark scales. The basal lines are strongly marked, the space between them being sometimes filled in with black, especially in first-brood males.

Up. s. h. w.: The border has less tendency to divide than that of the fore wing. The lunules are generally distinct, but often very narrow. The outer and inner lines vary much in breadth. The discal spot and the upper part of the extra line are generally clear of the suffusion, and sometimes the whole of the line is visible. In Zeller's example, however, the extra line is involved in the suffusion. The basal spot is clear and generally as conspicuous as in *athalia*.

Un. s. f. w.: Generally speaking, by far the most heavily and distinctly marked of the group, especially in the male. The inner edging line of the border is more or less arched or angled; the lunules are often narrow, but light and clearly marked, except in dark specimens of the first-brood males. The outer subterminal line shows as a dark inner edging to the lunules, and is generally rather suffused, especially towards the anal angle. The inner subterminal is only indicated in the female, but generally clear and pronounced in the male, and is less straight than on the upper side. Between the two is a row, or part of a row, of light spots, which often recurs between the inner one and

the elbowed line. The latter is nearly always distinct and pronounced throughout its entire length, a character very rare in any other species. The marginal blotch is not large, but has a tendency to reproduce at least the inner half of the characteristic mark of *berisalensis*, in consequence of its frequent junction with another dark mark nearer to the base, which usually takes more or less the shape of a V, or of the symbol of Aries r , placed sideways, and opening inwards instead of outwards, as in *berisalensis*. Sometimes the whole x is shown thus α . The outlines of the stigma, and three basal lines, with a basal dash, are also strongly marked.

Un. s. h. w.: The inner edge of the border is arched or angled (slightly angled in Zeller's specimen). The lunules vary much in size, being generally large, but occasionally very narrow. The outer band is interrupted towards the costa, as in *dictynna*, and contains, like *dictynna*, a dark spot, or at least indications of one, on or near the outer edge in each interneural space below the light patch or patches interrupting the band. This character, to which Rühl draws attention, is more pronounced in most of the Reazzino specimens, though quite distinguishable in Zeller's, and clear in the second lunule. The inner division of the central band is darker than the outer, and projects so far outwards in the third and fourth interneural spaces below the costa as often to push the two corresponding spots of the outer division right outside the rest of the band. In Zeller's specimen they are not outside, though pushed far outwards. The inner band is often noticeably broad in the centre, and the light spot large. The central spot of the basal band is rarely conspicuously small.

DICTYNNA.—The ground colour of the upper side, especially in the male, is often much obliterated by the black suffusion.

Up. s. f. w.: The lunules, except the third from the anal angle, and occasionally even this, are generally reduced to a series of narrow streaks or small spots (though sometimes all are distinct and of moderate size in the female) in consequence of the outer subterminal line more or less coalescing with the border. Inner subterminal broad and only slightly straighter than in *athalia*. Elbowed line often obliterated by the suffusion, but when visible not generally very broad. Stigma rather narrow, and almost always filled in with black, or at any rate with dark scales, as is also the space between the basal lines. In the female the ground colour is often lighter between the inner subterminal and elbowed lines.

Up. s. h. w.: The black suffusion, especially in the male, nearly always extends almost to the inner line, and occasionally over the whole wing. Lunules usually distinct and light in the female, but rarely distinct and never light in the male. The ground colour usually shows in spots between the outer and inner lines, and often, especially in the female, inside the inner line. Basal spot rarely visible, though sometimes distinct in the female.

Un. s. f. w.: Both edging lines of the border very distinct, the inner one being much angled between the nervures. Lunules generally distinct and lighter (usually much lighter) than the border. Outer subterminal shows as a dark suffusion, sometimes more con-

spicuous towards the anal angle, and within it is a row, or part of a row, of lighter spots, followed by the inner subterminal line slightly indicated as a darker shade, but occasionally showing as a row, or part of a row, of dark spots, and sometimes quite wanting. Elbowed line generally indicated in the usual way, but sometimes traceable throughout, and sometimes wholly wanting except for the marginal blotch in the female. Outlines of stigma and basal lines generally distinct, and always visible, even when the other markings are almost absent; there is also a third short line near the base.

Un. s. h. w.: Inner edge of the border arched, especially near the costa. In the outer band the dark edging of the lunules is suffused, and each contains a dark spot in or near the outer edge. This band is nearly always interrupted by lighter patches in the last two or sometimes three interneural spaces before the costa, but much less markedly than is usual in *britomartis*. The three light bands vary from silvery white to bright yellow, but are always light, particularly the central one, in the female. Central spot of basal band seldom noticeably small.

ASTERIA.—Up. s. f. w.: Lunules generally appear as quadrate spots, lighter—sometimes much lighter—than the ground colour, the third rarely projecting much inwards, and often smaller than some near the costa. Outer subterminal line rather sharply angled outwards nearly half-way down; both are very variable in thickness, the inner not greatly bowed outwards. Elbowed line thickish and strongly bent, sometimes appearing to run into the lower half of the inner subterminal. Marginal blotch very variable, sometimes even showing the *x*-mark of *berisalensis*. Stigma also very variable, ranging from a mere line to a round outline, filled or not filled with black. Basal suffusion of variable extent often including the basal lines and sometimes the lower half of the elbowed line. Space between the basal lines, when visible, generally filled with black. The ground colour of the upper side often shows indications of lighter and darker alternate bands, sometimes so strongly as to suggest *merope*.

Up. s. h. w.: Border occasionally shows signs of dividing. Both lines generally thick; extra line and discal spot covered by the suffusion; basal spot sometimes conspicuous, but generally covered.

Un. s. f. w.: Only one edging line to the border. Lunules rather quadrate and very light; a second and often a third row of light spots are visible, but generally slightly darker than the lunules. The outer subterminal shows as an edging to the lunules, the inner as at least a darker shade. The elbowed line shows sometimes only on the costa and inner margin, but is sometimes distinct throughout; the costal spots representing this line are sometimes ringed. The marginal blotch is as variable as on the upper side. Outlines of stigma and basal lines clear.

Un. s. h. w.: Only one edging line to border. This is the outer, for there are indications of the inner on a Tyrolean specimen in the Leach collection. Terminal band broad. Outer band very variable in the form of the lunules, proportion of the two parts, and depth of colour. Central band generally almost unicolorous, and the dividing

black line generally very slightly represented, or even absent. Inner band dark, not usually very broad in the centre. Light spot of varying size and shape. Basal band has the second spot conspicuously the largest. The light bands vary in shade from white to pale buff.

(To be continued.)

NOTES AND OBSERVATIONS.

ZYGÆNA FILIPENDULÆ WITH LIGHT PINK SPOTS AND HIND WINGS.—On July 23rd I was walking on the hill at Lewes when a very large *Z. filipendulæ* settled on the grass just in front of me. Unfortunately I had neither net nor box available. It remained, however, long enough for me to see that the spots on fore wings and the hind wings were of light pink instead of the usual carmine.—JOSEPH ANDERSON; September 23rd, 1908.

EPINEPHELE TITHONUS PAIRED WITH *E. HYPERANTHUS*.—The above species were observed paired in North Cornwall on July 27th by Mr. A. L. Rayward and myself. The male was *E. tithonus*. There is a record in the 'Entomologist,' vol. xix. p. 230, by Mr. Percy Rendall, of *E. ravina* being found paired with *E. hyperanthus* at Brockenhurst. So far as I am aware, the pairing of *E. tithonus* with *E. hyperanthus* has not previously been recorded.—A. HARRISON; Delamere, Grove Road, South Woodford.

OVIPOSITION OF A HYPERPARASITE (CHALCID) OF *PIERIS BRASSICÆ*.—At the end of June, 1908, some larvæ of *P. brassicæ* were sent to me from Yeovil, and on July 1st large numbers of the larvæ of the Braconid (*Apanteles glomeratus*) emerged from some of them. Whilst watching this process I chanced to notice that a small hymenopteron was paying particular attention to an apparently healthy Pierid larva, and seemed to be ovipositing therein. I isolated the larva and its tormentor, and the ovipositing still continued. Two days later the usual batch of *Apanteles* larvæ left this caterpillar and spun their cocoons. On July 13th several imagines emerged from these cocoons, about half producing the parasite. On July 29th the expected hyperparasite emerged from the remaining cocoons. The point of this note is to show that the hyperparasite oviposits in the larva of *Apanteles* while the latter is still within the body of its host, and not, as is often supposed, either in the Braconid larva soon after emergence from the Pierid, or after it has spun its cocoon.—G. T. LYLE; Brockenhurst.

ABRAXAS GROSSULARIATA, ab.—The pretty variety of this species figured on Plate vii., fig. 1, was taken with three others at Saltaire, Yorkshire, July 3rd, 1908, by Mr. J. A. Beck. The base, and outer border of post median band on the fore wings is yellow; and there is a tinge of the same colour about the middle of the band on the hind wings. The specimen is rather larger than shown in the photograph.—R. S.

ABRAXAS SYLVATA (ULMATA).—The curiously blotched and irregularly banded aberration of this species shown on Plate vii., fig. 2, was taken by Mr. Arthur J. Scollick in a wood near Chalfont, Bucks, during the summer of 1907. I may mention that in July of the present year, when collecting in the same wood, I picked up, among other interesting forms, a specimen with lead-coloured hind wings, but normal fore wings.—R. S.

CAPTURES AND FIELD REPORTS.

POLIA CHI AT TORQUAY.—While bicycling along a road in the neighbourhood of Torquay on August 27th I found several specimens of *Polia chi* at rest on the tree-trunks. Is it usual to find this species so far south?—J. S. CARTER; Radley College, Abingdon.

[Other Devonshire localities from which this species have been recorded are—Dartmouth (common), Plymouth, Dartmoor, and Avonwick.—ED.]

POLIA CHI IN BERKSHIRE.—Mr. W. H. Warner of Fyfield, Berkshire, recently sent me a moth that he thought must be a specimen of *P. chi*. I was very pleased to confirm his identification.—RICHARD SOUTH.

RHODOMETRA (STERRHA) SACRARIA IN DEVONSHIRE.—On September 12th last, I took a beautiful female specimen of *Rhodometra sacraría* sitting on a dock-stem in South Devon about 10 p.m.—H. M. EDELSTEN; Forty Hill, Enfield, Middlesex, September 25th, 1908.

PRIONUS CORIARIUS, Linn., AT SUGAR.—Whilst "sugaring" in Epping Forest on July 23rd, I took a large female of this species upon the sugar patch. I know of two other specimens taken last season in the same way. I should like to know if any other entomologists have had this experience.—H. F. HUNT; Walthamstow, Essex, September 7th, 1908.

CERURA BICUSPIS AT CHESTER.—At midnight, May 29th, I found a nice specimen of this rare moth at rest on the city wall just under an electric lamp. This is the first record for Chester. Other records for Cheshire are two larvæ by Mr. F. C. Woodford at Wybunbury Moss, and two fine imagines at the White Hall electric light, near Tarporley, by Mr. J. H. Stock.—J. ARKLE; Chester.

PYGERA ANACHORETA, &c., IN ESSEX.—I have pleasure in recording the capture on August 8th of a specimen of *P. anachoreta* at Clacton-on-Sea at electric light. This proved to be a female, and ova were deposited on August 9th, 10th, and 11th to the number of one hundred and sixty-three. They commenced hatching on August 20th, and are now feeding up on poplar. This appears to be a new locality for this species, the only records that I can find having previously

been on the Kentish coast, and then chiefly in the larval stage. I also obtained by the same means a specimen of *Pygæa curtula* on August 14th, which was also a female, and from which I obtained only twenty-six ova. No others of these species were seen, and it is curious to note that they should both be females, thus proving that it is not always safe to assume that moths caught at light are necessarily males.—GEO. P. KITCHENER; 13, Birchington Road, Crouch End, N.

OCCURRENCE OF *ACHERONTIA ATROPOS* IN HANTS.—This is evidently another *atropos* year. I have already had three pupæ brought me dug up among potatoes in three different gardens. Two years ago no fewer than twenty-seven larvæ were found in a kitchen garden in the neighbourhood, but they were all destroyed by the gardener's spade as "venomous beasts" before I heard of them.—(Rev.) J. E. TARBAT; Fareham, Hants.

ACHERONTIA ATROPOS IN SUSSEX.—Three larvæ of this species were brought to me the latter end of August; two of them pupated all right, but the third was unfortunately injured, and died in the larval stage. This is the third year in succession in which I have obtained either larvæ or imagines of this species. A friend of mine at Eastbourne has also obtained a specimen of the moth this week.—W. JARVIS; 22, Leicester Road, Lewes, Sussex.

ACHERONTIA ATROPOS IN NOTTS.—On September 22nd a good specimen of this species was brought to me, having been taken at rest on an electric light standard in this town. I have no previous record of the imago for this district.—E. MAUDE ALDERSON, F.E.S.; Worksop, Notts.

COLIAS EDUSA IN DORSET.—On August 8th, when sitting in a train which had drawn up for a few minutes outside Upwey Station, between Dorchester and Weymouth, I saw a male *C. edusa* on the flowers of the railway-bank just under the windows of the carriage.—FRANK E. LOWE; Guernsey.

This butterfly is about here this month, but very sparingly. I have only seen one specimen inland; the usual haunt of the species is the under cliff, which for miles along this coast represents the result of former landslips.—R. MELDOLA; Lyme Regis, September 15th, 1908.

COLIAS EDUSA IN HANTS.—This butterfly occurred sparingly around Chichester during July and August.—JOSEPH ANDERSON; September 23rd, 1908.

COLIAS EDUSA IN KENT AND MIDDLESEX.—I had the pleasure of capturing, after a stern chase, a somewhat ragged female of *Colias edusa* ab. *helice* on 8th inst. near Deal, a clover patch being quite near. I may add that *C. edusa*, *Pyrameis cardui*, and *P. atalanta* were fairly abundant here.—F. H. MOORE; Barnet, September 25th, 1908.

COLIAS EDUSA, &c., IN HERTS.—On September 2nd I saw a specimen of *Colias edusa* caught by two boys near Roman Camp, Letchworth. I was collecting, and was sorry to see evidence that these juveniles had no knowledge of entomology, as they had this species and "whites," as well as others, mixed up in a match-box. Such wanton destruction is to be regretted. The variety *helice* was seen by a friend a few days after, it flew past him, when he had a good view of it. This occurred in the same place. A specimen of *P. cardus* was caught in Garden City on September 2nd. — (Rev.) E. EVERETT; Ashleigh, Pix Road, Letchworth, Hitchin, September 25th, 1908.

HUNTINGDONSHIRE DRAGONFLIES, 1908.—In the course of a visit to Huntingdonshire during the second half of last month, I was able to add several fresh species to my list of Odonata (known locally as "needles") occurring in that county ('Entom.,' 1907, p. 257). The most interesting addition was *Lestes dryas*, of which a few males and females were secured, on July 27th and 31st, in deep ditches well furnished with vegetation, at two localities near Ramsey. The specimens taken were in fully adult condition, and some of them were paired. It will be remembered that in 1893 and 1897 Mr. K. J. Morton obtained this scarce insect in the adjoining county of Cambridge.

Other additions to my list were:—*Sympetrum striolatum*, newly-emerged females, Hartford (July 29th) and Ramsey (July 31st); *S. sanguineum*, adult males and females, Ramsey (July 27th and 31st); *Lestes sponsa*, occurring with *L. dryas*; *Ischnura elegans* var. *rufescens*, and *Enallagma cyathigerum*, flying in great swarms over the Forty Foot Drain. Of the last-named species, both forms of the female were taken. The exceptionally favourable opportunities for observation afforded by the Forty Foot Drain enabled me to satisfy myself beyond question that males, at all events, of *E. cyathigerum* frequently fly backward as well as forward. The insect is seen to hover on the wing for a few seconds, and then the backward flight begins, which is sometimes sustained for a foot or more, although more often the forward movement is resumed when a retrograde journey of a few inches only has been accomplished. The following species and variety, previously recorded from Hartford, were met with again at that place:—*Calopteryx splendens*, one pair (July 21st); *Erythronina naius*, scarce (July 29th); *Ischnura elegans*, with its dark var. *infuscans*; and *Agrion pulchellum*, scarce (July 21st). Teneral individuals of *I. elegans* occurred abundantly where the species was present, and it was plain that the second emergence was taking place. *Sympetrum scoticum* was seen in the county, but not taken, as were also *Aeschna grandis* and, probably, *A. cyanea*, but the scarcity of larger dragonflies, both as to species and numbers, was quite remarkable.—F. W. CAMPION; 33, Maude Terrace, Walthamstow, Essex, August 31st, 1908.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—June 25th, 1908.—Mr. A. Sich, F.E.S., President, in the chair.—Mr. Hy. J. Turner exhibited a female specimen of *Agriudes bellaryus*, caught at Rammore, measuring only 22 mm. in expanse, and an example of *Hesperia malva* from Eastbourne, with hind wings normal, but having coalesced blotches on the fore wings as in *ab. taras*.—Mr. Newman, living larvæ of *Xylina semibrunnea*, with that of *X. socia* for comparison, pointing out the peculiar green ground tint and the more distinct lateral line of the former.—Mr. Adkin, light and dark forms of *Biston hirtaria*, pointing out that the difference was permanent through each moult, and that the depth of colour did not seem to depend upon environment.—Mr. West (Greenwich), the following Hemiptera taken by him in June in New Forest :—*Cicadetta montana*, *Sigara minutissima*, *Eysarcoris ceneus*, and *Orthostira cervina*.—Mr. Carr, the nymph-skin of the large dragonfly *Anax imperator*, found at Oxshott.—Mr. Sich, a larva and pupa of *Parnassius apollo*?, sent by Mr. Egbert Sich from the Engadine, Switzerland, and stated that when irritated the larva protruded an osmaterium. Mr. Tutt called attention to the waxy secretion covering the surface of the pupa, which effectually secured it from the damp of the marshy ground upon which it pupated.

July 9th.—The President in the chair.—Mr. Newman exhibited a rayed variety of *Abraxas grossulariata*.—Mr. West (Greenwich), a short series of the local coleopteron *Dytiscus circumcinctus*, from Great Yarmouth, and specimens of the rare *Bidessus unistriatus* from the same place.—Mr. R. Adkin read a short account of the various meetings held during the Congress of the South Eastern Union of Scientific Societies at Hastings. Messrs. Sich and Step made a few remarks on the excursions made during the Congress.

July 23rd.—The President in the chair.—Mr. Sich exhibited *Cerostoma xylostella* (female), and said that it was bred from a larva without the broad reddish stripes down the back, which form he said might be sexual.—Mr. Turner, living larvæ in their curiously contorted cases of the very rare *Coleophora siccifolia*, taken by Mr. Sich and himself at Chiswick. He also showed a large number of Pyralidæ from North America.—Mr. Newman, a living hybrid larva, *Smerinthus ocellata-populi*, and noted its distinctive characters. He also showed bred specimens of *Argynnis paphia* var. *valesina*, *Boarmia repandata* var. *conversaria* (produced in the third generation), and the yellow form of *Callimorpha dominula* (also of the third generation).—Mr. Adkin exhibited series of *Xylina semibrunnea* and *X. socia*, and read notes on the differentiation of the two species, calling attention to the wing form, the black blotch in the anal angle of the former, and the absence of any distinct band in the same species. Mr. South, in addition, noted the inner marginal line in *X. semibrunnea*, the brown,

not black, abdominal tufts in *X. socia*, and the much darker thorax of the form.

August 13th.—The President in the chair. — Mr. C. W. Spurring, of Blackheath, was elected a member. — Mr. R. Adkin exhibited a series of *Odontopera bidentata*, bred from melanic parents from Yorkshire, and read notes on the forms. All but three followed the parents. — Mr. Newman, bred specimens of *Argynnis paphia* and *A. aylara*. — Mr. Edward, a female *Nemotois cupriacellus*, taken at Byfleet. He also showed a large number of Diptera, Hemiptera, and Hymenoptera taken by him at Cannes, Fontainebleau, and Grandaneza. — Mr. Sich, the larva of *Aristotelia stipella* var. *naviferella*, a miner in *Chenopodium* leaves and the rare alien yellow knapweed (*Centaurea solstitialis*), found at Chiswick. — Mr. West (Greenwich), the following Hemiptera from Esher:—*Salda cocksi*, *Cyrtorrhinus pygmaeus*, *C. caricis*, and *Nabis boops*, with *Bryocoris pteridis*, from Carlisle. — Mr. B. H. Smith, ova of *Porthesia chrysorrhæa*, laid on sea-buckthorn at Deal. — Mr. Step, on behalf of Mr. Carr, a variegated form of *Senecio jacobææ* from Box Hill.

August 27th.—The President in the chair. — M. R. Adkin exhibited two series of *Dictyopteryx berymanniana*, one bred from garden rose and the other from wild burnet rose, and read notes on the different habits of the two broods of larvæ. — Mr. Turner, a light form of *Crambus chrysonuchellus*, characteristic of Eastbourne, and two forms of *Eurrhynx urtica*, one having the marginal spots small and well separated, the other having them coalesced into a wide band. — Mr. Brown, a specimen of *Leucania flavicolor* from Benfleet. — Mr. Newman, examples of the hybrid *Smerinthus ocellata-populi*, just bred; *Crymodes exilis* from Shetland, including females; living larvæ of *Dicranura bicuspis* from Tilgate Forest; an *Abraxus grossulariata* with the hind wings with only rayed marginal spots and the discoidal; a *Melanargia galathea*, the left hind wing of which was var. *procida*. — Mr. Joy, a living larva of *Cycloptides palæmon* (*paniscus*). — Mr. Cowham, two *Amphidasys betularia*, one having the basal spot absent on the fore wing, but with white discoidal spots, and other having a large whitish costal blotch on the lower wing. — Mr. B. H. Smith, a bred series of *Eugonia polychloros* from the New Forest, including a dark smoky form. — Mr. Goff, a *Rumicla phlaeus*, showing a complete absence of copper on the lower wings. — Mr. Sich, mines of *Nepticula acetosæ* from Surrey, and gave notes on the life-history of the species. — Mr. Fremlin read a short paper entitled "Insects as Carriers of Disease." — H. J. TURNER, *Hon. Rep. Sec.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

—*September 1st, 1908.*—A resolution was passed in support of The Public Rights of Way Bill and the Access to Mountains Bill. — Mr. J. A. Clark exhibited *Arctia cara* ab., Hailsham, June, 1908, the upper wings being deep chocolate-brown with only slight traces of usual cream ground colour, and under wings smoky black with intense black spots and pinkish margin. — Dr. G. G. C. Hodgson exhibited *Nemoria viridata*, Surrey, May and June, 1908, including female with usual white lines very faintly marked, and another female with two

white striæ, one on costa of secondaries, and another just above centre of primaries; also larvæ of this species found feeding on *Genista anglica* and heather blossoms.—Mr. A. W. Mera, *Malacosoma* (*Bombyx*) *castrensis* from Essex, including a unicolorous buff aberration.—Mr. J. Riches, a series of *Plusia moneta* from Hornsey.

September 15th.—Mr. J. A. Clark exhibited *Sirex juvenescens*, female, two and a quarter inches across, taken in his garden at Crouch End.—Mr. T. H. L. Grosvenor, variable series of *Cænonympha pamphilus*, including specimen with ocelli on under side of fore wings obsolete.—Dr. G. G. C. Hodgson, pupæ of *Lycana bellargus* in lightly-spun cocoons of silk and leaves; also a bleached *Argynnis euphrosyne*, Sussex, May, 1908.—Mr. G. H. Heath, *Anosia plexippus* found dead in the grass at Sandown, Isle of Wight, September 13th, 1908, while searching at night for *Aporophyla australis*.—Mr. L. W. Newman, *Crimodes exulis*, from Shetlands, including a specimen of female, which is rarely met with; a variable lot of *Abraxas grossulariata*, including var. *varleyata*, from Yorks; *Argynnis paphia* ab., with upper wings suffused with black, save for small area at base; and a yellow *Arctia dominula*—in connection with the latter exhibit, Mr. Newman stated that the imagines raised from a pairing of same with type proved to be all typical, but the progeny of these typical specimens included twenty-five per cent. of the yellow form.—Mr. C. P. Pickett, *Epinephela hyperanthus* var. *obsoleta*, Dawlish, July, 1908; also *Campptogramma bilineata*, with inner line on upper wings much accentuated, so as to form a black blotch.—Mr. L. B. Prout, *Zonosoma linearia*, from Ashford, showing a somewhat similar exaggeration of central line on fore wings.—Several members mentioned having received advice from friends, entomological and otherwise, on the south coast of large immigrations of Pieridæ.—S. J. BELL, *Hon. Sec.*

RECENT LITERATURE.

Forest Entomology. By A. T. GILLANDERS, F.E.S., Woods Manager to His Grace the Duke of Northumberland, K.G. Pp. i-xxii and 1-422; with 351 illustrations in the text. Edinburgh and London: William Blackwood & Sons. 1908. Price 15s. net.

THIS well-illustrated volume opens with some general remarks on classification, life-history, and structure of insects. Then we have ten chapters as follows:—1. Eriophyidæ (Gall-mites); 2 and 3. Coleoptera; 4 and 5. Hymenoptera (oak-galls, sawflies, &c.); 6. Coccidæ; 7. Lepidoptera; 8. Aphididæ; 9. Diptera. Chapter 10 is divided into Part 1. Psyllidæ, and Part 2. Cicadidæ. Chapters 11-13 deal with Collecting, Preparation and Mounting, Insecticides, &c., and Beneficial Insects. A list of trees and their injurious insects comprises Chapter 14. There is also an index of six pages.

Perhaps the best chapters are those on the Coleoptera, especially that in which the Scolytidæ are considered, and the Hymenoptera. The order Lepidoptera is not treated at any great length, and the

only Noctuid moth referred to is *Trachea pimperda*, which, although it devours the needles of Scots pine, is not regarded as a serious pest. We should add here that the author deals with his subject mainly from the economic point of view.

The author expressly states that he has not exhausted the subject, and we agree with him in this, but as first aid in the study of forest entomology the book has considerable merit, and will be exceedingly helpful.

In remarks on *Dioryctria abietella* (p. 258), the larvæ of the species are stated to be injurious to the cones of spruce fir (*Picea excelsa*) and silver fir (*Abies pectinata*). There is presumably some confusion here, as it is the larva of *D. splendidella* that feeds in cones; that of *D. decuriella* (*abietella*) attacks the shoots of *Pinus sylvestris*. The last-named species is well known to occur in the North of England, but only one example of *D. splendidella* has hitherto been recorded from the north (Hartlepool, 1891).

Among observations upon members of the Tortricid group of moths, we note that the larva of *Pædisca ophthalmicana* is blamed for doing damage to holly. We should say that moths reared from larvæ living in packets of terminal leaves of the holly, as depicted on page 266, fig. 253, would be referable to *Rhopobota* (*Grapholitha*) *nevana*.

The species represented on page 269, fig. 256, is certainly *Retinia buoliana*, but moths bred from larvæ feeding in the leading shoots of Scots pine, as illustrated (fig. 255), are usually *R. pinicolana*, a very closely allied but clearly distinct species.

These possible errors in identification are referred to more particularly to emphasize the author's caution in the preface, where he remarks: ". . . I trust that the student will take up the subject with the object of making a study of it on his own account, and verify each point by observation and rearing."

*Thirty-first Annual Report and Proceedings of the Lancashire and
Cheshire Entomological Society. Session 1907.*

In addition to the reports of meetings, this excellent little volume comprises among its contents the Vice-President's Address, by J. Harold Bailey, M.B., Ch.B. (pp. 18-40), which deals with the Coleoptera of the Isle of Man, and is a valuable contribution. The Coleoptera of Lancashire and Cheshire, by W. B. Sharp, F.E.S., an important annotated list of species (numbering 1486) found in the two counties, is also included, but this is paged separately, 1-75. A portrait of J. R. le B. Tomlin, M.A., F.E.S., is finely printed on plate paper.

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MALACOSOMA NEUSTRIA AB.

BY THE HON. N. CHARLES ROTHSCHILD, F.E.S.



THE above curious aberration of *M. neustria* was reared on August 26th, 1907, by Mr. Frederick Palin, of Ashton Mill, near Oundle, from a cocoon collected in the village of Ashton.

THE BASSES-ALPES IN AUGUST.

BY H. ROWLAND-BROWN, M.A., F.E.S.

CIRCUMSTANCES conspired to keep me in London until the end of July, and to shorten the days which each year I endeavour to devote to the study of the butterflies of the Continent. I thought, however, that there might be compensations in a visit to the Basses-Alpes, even thus late, and *Erebia scipio* was the particular objective of my journey. My records for this interesting species show that it affects the Dauphiny Alps as well as the Dourbes at Digne. M. Chrétien, an authority on the mountain butterflies of France, has taken it at Monetier-les-Bains: Mrs. Nicholl informs me that it occurred not uncommonly some years back at Vallouise—both places within easy access of the Briançon railway. But never having tried Barcelonnette, and finding that the French collectors of an earlier day had met with it in this region, I detoured—most unluckily as it turned out—at Prunières, and the same evening (August 1st) found

myself in this pleasant little Alpine town. Here I spent three days. But though twice I ascended to the higher *Erebia* zone on the path (?) to the Pain de Sucre, on both occasions cloud and heavy rain, succeeding bright mornings, destroyed any chance I may have had of netting *scipio* there, and I was compelled to defer my hopes elsewhere. While the sun shone, however, there were many butterflies on the wing, though for the most part decidedly *passés*. Just outside Grenoble, from the train window, I had noted fine fresh examples of *Papilio podalirius* of the second brood, and *Satyrus circe*. On the mountain-paths round Barcelonnette the commonest insects were unquestionably *Polyommatus damon*, and the same splendid Satyrid, with battered Argynnis and Melitæids—*D. paphia*, *A. adippe* (none seen of the *cleodoxa* form, generally common in the South of France), *A. niobe*, *M. phæbe*, females; while of the fresher order, fine, brightly-coloured *M. didyma*, with typical females, and *Brenthis ino* among the wild raspberry were abundant. Following some distance up the valley the rivulet which descends from the Pain de Sucre, and falls into the Ubaye at the iron town-bridge, I found *Erebia neoridas*, males, in fine condition, single *Polygonia c-album*, and representatives of all the August Satyrids—*S. hermione*, *S. alcyone*, *S. statilius* var. *alkonia*, *S. cordula* (worn), *Hipparchia briseis*, fine and large, and *H. semele*, of course, with brilliant *Pararge mæra* var. *adrasta* on the warm stone walls which separate the little plots of cultivated land. Most of the lower *Erebias*, however, had obviously seen their best days. *E. stygne* was in rags; *E. æthiops* not much better, and a few *E. ligea*. But at about 5000 ft. the condition of most things showed an improvement. *E. euryale*, a quite undistinguished form, was swarming, and scattered *E. tyndarus* disclosed the form *dromus*. On a marshy patch *Cænonympha iphis* put in an appearance; and I should add that faded females of *C. dorus* and *C. arcania* were also to be seen on the lower paths, with *Thymelicus actæon*, *T. lineola*, and occasional *Pyrgus sao*. "Blues" were conspicuous by their absence, except *damon*. *P. corydon* was quite rare: one or two *P. escheri*, and *P. alexis*, a single *P. baton*, and a worn male *P. optilete* high up, with *Rusticus argyrognomon* constituted a meagre bag.

Noting in Mr. Wheeler's 'Butterflies of the Central Alps' that Allos is given by Mr. Powell as a locality for *E. scipio* I transferred my attentions thither on the 5th. The drive over the Col d'Allos in the "Cars Alps" is pleasant enough, the road gradually rising from the valley by lavender-covered slopes alive with *Colias edusa*, *Satyrus cordula*, and *Callimorpha hera* to the regular zone inhabited by *Parnassius apollo*, and I daresay many other Alpine species. But as the sun now disappeared for something like forty-eight hours, and the rain descended during the whole of my first day at Allos without a moment's inter-

mission, the Col, entomologically speaking, is to me a blank. Nor do I fancy that the Allos side would be productive, as it is wholly devoid of forest and grazed apparently to the summit, which commands but a moderate view of the surrounding mountains. The 7th and the 8th of August as well as the 10th I devoted entirely to the neighbourhood of the beautiful Lac d'Allos, with the intention of tracking down the elusive *scipio*. But my evil star was in the ascendant, and though I penetrated high up beyond the lake itself, which lies at over 7000 ft.—an expanse of lapis-lazuli in a setting of sombre peaks, not in shape unlike the Dolomites—again clouds and rain disappointed my search.

Except on the 8th, when I was soaked to the skin in a terrific thunderstorm which found me with no better shelter than a willow-tree, the lower stages of the mule-path that leads first to the forester's house—round which the reafforestation of the bare hills is in full swing—were warm and sunny. About a quarter of an hour from the village the track is shaded by a wealth of wild fruit trees—pears, apples, cherries, and sloes, and hereabouts worn males of *Thecla acaciæ* were drinking in the honey of the white stone-crop, while the females might be seen ovipositing on the sloe-bushes—always favouring the meanest specimens: *Thecla spini*, a little less disreputable, was also in evidence, with worn *Limenitis camilla*. In the open, fresh *Pontia daphidice* and *Erebia neoridas* males were again in profusion, with *Epinephle lycaon*, males of *Chrysophanus virgaureæ*, and *Hesperia comma*, the uncut meadows revealing occasional *Aporia crategi*, and by the woodsides innumerable *Erebia euryale*. Curiously enough, with the exception of a single brilliant *Aglais urticæ* on the shore of the Lac, I do not remember to have seen a single Vanessid on the Basses-Alpes in the first fortnight of the month except *P. c-album*.

The mountains round Allos, as the inhabitants are proud to inform us, partake much more of the character of the Swiss Alps than of the Basses-Alpes. But this season, at all events, butterflies did not appear in anything like the profusion to which those who collect in Switzerland are accustomed. Except *Coenonympha iphis*, which occurred wherever its food-plants grew, I cannot say that any single species was really common. At 5500–6000 ft. males of *Chrysophanus hippothoë* var. *eurybia* were in evidence, and I took a female of *C. virgaureæ* which stands midway between the type, and the var. *zermattensis* in the distribution of colour. *Brenthis amathusia* was rare, as also *B. pales* var. *arsilache*, their condition showing that it was not a result of my coming too late upon the ground. Small *E. goante*, a form of *E. var. cassiope* (= *obsoleta*, Tutt) and *E. var. dromus*, made up the *Erebia* record of this part of the walk; and it was not until I arrived at the mountain-wall which encloses the Lac that

I first encountered *E. mnestra*, *E. gorge*, mostly ab. *erynnis*, and what I take to be a small form of *E. glacialis*. The flowery banks that slope towards the water were haunted by *Colias phicomone*, *Nomiades semiargus*, and *B. pales*, and just when the sun went in I took a couple of female *P. eros*, and a male with nicely confluent spots on the under side; while somewhat lower a few fresh *Zygæna achilleæ* flickered among the tall grasses. This was on my first visit. The next day, crossing over the grassy intervening hills golden with hawkweed and arrayed with many bright Alpine flowers besides, I found butterflies scarcer than ever, though I met with a nice form of *H. alveus*, and a single *P. orbitulus*, noting further a fine male *Gonepteryx rhamni* at about 7300 ft. Proceeding on to the rocks in the direction of the Col de St. Martin, and working well up to the snow, nothing better than a battered *E. gorge* or two turned up, and a few *Zygæna minos*. Evidently I had not found the haunts of *E. scipio*, and the locality included under the rather comprehensive style of "Allos."

On the 11th I walked down through picturesque Colmars, with its quaint walled town and mediæval fortifications, to Beauvezer, where I found myself in the Basses-Alpes proper, and after a halt of two days in the admirably arranged Hôtel Alp—in lovely weather which produced nothing novel except females of *E. neoridas*, and exquisite examples of *Zygæna fausta* and *Z. carniolica*, with *P. dorilis* and a stray *P. melcager* var. *steveni* from the lavender-covered hills—I found myself once more at the familiar railway-station of St. André-de-Méouelles. From that day onward, with one black exception, the weather proved all that could be desired, and, though I had intended to pass no more than a few hours at Digne, so agreeable did I find the air of that—in August—usually stuffy town that I remained at the Hotel Boyer-Mistre for an entire week, still buoyed up with visions of *E. scipio* on the Dourbes, an expedition in the height of summer not to be undertaken lightly, and hitherto shirked completely by me.

My notes for August 14th commence: "In the wonderful 'Eaux Thermales' valley, and wonderful it certainly is to the collector who has the good fortune to be there any time from the first week in April onwards to the autumn, for I have seen it even in October full of insect life, and I suspect that there are few fine days in the year when it would not afford one or other of the continuous brooded *edusa*, or of the butterflies which we regard as hibernators. On this fresh summer morning, throughout that part of the valley from the sudden source of the clear brook to its junction with the Torrent des Eaux-Chaudes—now shrunk to a mere thread of silver water—the whole air is alive with the music of bird and insect, for I have noticed that in the South of Europe the summer silence characteristic of English wood is broken long

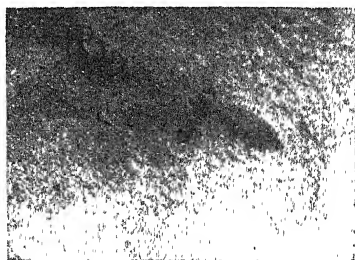
after the spring is over, and the nightingales make music in the willows of the Bléone even to the end of June. Round the tall up-standing thistles there is a battle royal for the purple flower-heads, and it is amusing to see how the pugnacious 'skippers' will put to flight even the monster Argynnis and the heavy lumping *Euodia dryas*, which I have found nowhere in the Basses-Alpes but here. On the warm mud of the riverside a single *Pyrgus proto*, *Carcharodus althææ*, *Hesperia carthami*, and *H. alveus* var. *cirsii* with the bright rusty-red under side dispute with clouds of the beautiful silky-white *P. corydon* of the region. Males of *P. meleager* are also not uncommon; and it must have a prolonged emergence, as I have taken it at Digne in former years as early as June 14th. *P. bellargus* is over for the time being, but *P. hylas* of the second generation is emerging, and tiny males of *P. baton*, no larger than smallest *C. minima*. Some day I fancy the 'forms' of this little butterfly, too, will be separated into species; superficially, at least, the fine mountain *baton* and the *baton* of the Mediterranean coast in March and Digne in August are widely different. Round the willows flit the second brood of *Cyaniris argiolus*, with lovely lilac-winged females, strongly suffused with black; *Rusticus argus* is also in prime condition, with *Chrysophanus virgaureæ* females of surpassing brilliancy and size. *Leptosia sinapis* var. *diniensis* and single *L. duponcheli* represent the autumn emergences, and the second brood of *Melitæa deione*—here unmistakably distinct from all its congeners—is not uncommon, though the males are showing signs of wear already. A fine red *M. parthenie* is also easily identified; but in point of numbers *E. neoridas* is an easy first, with *Epinephele tithonus* crowding the dull pink blossoms of *Eupatorium*, where *C. hera* is also in strong force. What a rainbow cloud of colour streams upward when, in striking at some more than usually attractive specimen, the whole array of banqueters rises in the air! *Limenitis camilla* is in such splendid condition that there can be no doubt of its constituting a second brood; on the opposite bank, in the full glare of the sun, when the white thyme and the gennifer fill the air with sweet perfume, *Gonepteryx cleopatra* is sailing lazily, and the rocks are alive with the warmth-loving Satyrids. Commonest of them are now *Satyrus statilius* var. *allionia* and *Hipparchia arethusa*—the latter in myriads; *S. actæa* is on the wane, but before the day is over I meet with, for the first time in my experience, the female of *S. fidia*—of all the Satyrids most fair on the under side, and in its protective colouring also the most deceptive. Of *Papilio alexanor*, to whom the valley is consecrated in the memories of many others besides myself, there is no vestige, and that is the one disappointment of the day, though *P. podalirius* and huge *P. machaon* complete the picture. *P. admetus* var. *ripertii* is also looked for in vain, though higher up the valley

on the way to the Coussons the lavender is by no means flowered out, and the spikes are studded with the ruddy orange-red of *Zygæna fausta*, *Z. carniolica* var. *diniensis*, and occasional *Z. transalpina*. *P. meleager*, males, are also flying, and from a flower-head of *Eupatorium* I am presently fortunate enough to take what, at a distance, looks like a female of *C. virgaureæ*, but in the net discloses a female *C. alciphron* var. *gordius* with a somewhat remarkable under side, with the exception of the discoidal spot on the fore wings, the usual maculations being almost entirely absent, as one sometimes sees them in *L. arion*; and in the scheme of marking not altogether unlike the aberrant *cinnus* of *P. bellargus*."

(To be continued.)

A FOSSIL FLY OF THE FAMILY BLEPHAROCERIDÆ.

By T. D. A. COCKERELL.



Philorites johannseni, n. g., n. sp.

In his 'Western Diptera' (1877) Osten Sacken described the Blepharoceridæ as a "remarkable family—remarkable for its exceptional characters; for the paucity of the species, scattered through the most distant parts of the world; and for the variety of generic modifications which these species show in preserving at the same time with wonderful uniformity the very striking family characters, some of which are unique in the whole order of Diptera." These words are equally true to-day, although the number of known species has been somewhat increased. According to Handlirsch ('Die Fossilen Insekten') there are about thirty living forms described, but not a single fossil species. Of the thirteen families of Nematocerous Diptera recognized by Handlirsch, only two, the Blepharoceridæ and the Orphnephilidæ, are without fossil representatives.

That the Blepharoceridæ are not of recent origin is sufficiently manifest from their characters and distribution; hypothetically, Handlirsch supposes them to have arisen as long ago as the Lias. However this may be, it is of much interest to find a representative in the earlier Tertiaries of Colorado, throwing the first actual light on the early history of the group.

The fossil now described is one of a small series of fossil insects kindly loaned to me by Dr. S. M. Bradbury, of Grand Junction, Colorado. The specimens were found a few miles north of Rifle, Colorado, an entirely new locality for fossil insects. They consist of Coleoptera, Diptera, and Hemiptera (but no Hymenoptera), and occur in a sort of close-grained sandstone, varying in colour from dull grey to pale ochraceous or creamy. It is probable that they belong to the Green River Series, but they may be referable to the Wasatch. My colleague Professor R. D. George thinks that the rock looks like Wasatch, but the general facies of the insect-fauna recalls that usually ascribed to the Green River. The age is considered to be Eocene.

When I first examined the specimen, I thought it must belong to the Simuliidæ; but a closer scrutiny indicated that this was impossible. It did not seem to agree well with any described family; and being altogether perplexed, I sent a rough sketch to Professor O. A. Johannsen, of Cornell University. Professor Johannsen replied, suggesting that it might be referred to the Blepharoceridæ, and advising comparison with *Apistomyia* and *Hammatorhina*. With this clue I re-examined the fossil, and had little difficulty in determining that it was indeed a Blepharocerid. I found, also, that my original sketch was faulty in several respects, and, so far as I could ascertain, the affinities of the insect were with *Bibiocephala* and *Phylorus*, although it evidently represented a very distinct genus. Kellogg (Proc. Calif. Acad. Sci., 1903) has divided the Blepharoceridæ into two series, one with, the other without, an incomplete vein (branch of the media) near the posterior margin of the wing. The incomplete vein is present in all of the living North American forms, and is absent principally in the tropical genera. Owing to the conditions of preservation I am not able to quite clearly demonstrate this vein in the fossil, but I believe I can see it, and the probability of its existence is increased by the wide interval between the media and the cubitus, apparently needing such a support.

From all of the genera in the section having the incomplete vein the fossil is distinguished by the large costal cell, the position of the radiomedial cross-nervure, the long proboscis, and the short legs.

Philorites johannseni, n. g., n. sp.

Length, without proboscis, about 4 mm.; expanse about 9 mm.; head and thorax black; legs brown; wings ample, strongly fuliginous, the basal third of the costal region pale; proboscis stout, about 2 mm. long, palpi large, as usual, the apical portion slender, the tips falling nearly 850 μ short of tip of proboscis (*Apistomyia* has a long proboscis; *Paltostoma*, which has an exceedingly long proboscis, has rudimentary palpi); antennæ filiform, apparently normal, not especially short (full length uncertain, but over 1360 μ); eyes apparently prominent, but ill-preserved; a distinct dark V at base of hypopharynx (compare Kellogg's figure of *Bibiocephala elegantula*); thorax arched; abdomen short and broad (width about 1020 μ), approximately parallel-sided; hind femora short, failing by more than 510 μ to reach level of apex of abdomen; tibiae and tarsi slender, fairly long.

Radius, except of course apically, distant from costa, leaving a large costal cell, which is about 238 μ deep (this is much more like *Bibiocephala* than *Philorus*); vein R_{2+3} (following the nomenclature used by Kellogg) very weak, arising from R_{4+5} (which is strong) about 460 μ beyond origin of latter from R_1 , and branching about 646 μ from its origin, the branches running approximately parallel, to end about the apex of the wing, the branching being at least 2200 μ from the latter point; R_{4+5} ending (as in *Bibiocephala comstocki*) below the apex of the wing; radiomedial cross-nervure weak, but apparently at right angles to radius and media, and about 780 μ beyond mediocubital cross-nervure, and 1462 μ from margin of wing, measuring along media; cubitus with two branches, as usual, the lower branch conspicuously bent at the cross-nervure; anal weak, only partly visible. The vein R_{4+5} is not bent at the origin of R_{2+3} , or at the radiomedial cross-nervure.

In the table of Blepharoceridæ, *Philorites* will come in as follows:—

No incomplete branch of media	<i>Apistomyia</i> , <i>Hammatorhina</i> , <i>Paltostoma</i> , <i>Sackenella</i> , <i>Curupira</i> , and <i>Hapalothrix</i> .
With an incomplete branch of media	1.
1. Radius ₂ wholly fused with radius ₃	<i>Philorus</i> and <i>Blepharocera</i> .
Radius ₂ at least partly distinct	2.
2. Proboscis shorter than palpi	<i>Bibiocephala</i> .
Proboscis longer than palpi	<i>Philorites</i> .

In the venation, *Philorites* represents a more primitive condition of the branches of the radius than is seen in *Bibiocephala grandis*, the most primitive member (so far as the radius goes) of the living American species. The arrangement is, in fact, not very unlike that of *Dixa* and the Culicidæ.*

A few species of Blepharoceridæ exist to-day in the Rocky

* It is of interest to note that the Blepharoceridæ and Culicidæ agree in possessing the peculiar number of five (instead of four) Malpighian-tubes.

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Tome VI. 1892. 700 pg. avec 16 planches coloriées. M. 60,—

Inhalt: Alphéraky, Lépidoptères rapportés de la Chine et de la Mongolie par G. N. Potanine. II. — Erschoff, Verzeichnis von Schmetterlingen aus Central-Sibirien. — Standfuss, Lepidopterologisches. — Staudinger, Die Macrolepidopteren des Amurgebiets. I. — Table alphabétique.

Tome VII—VIII. 1893—1901. 714 et 616 pg. avec 57 planches coloriées. M. 155,—

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Tome IX. 1897. 365 pg. avec 14 planches coloriées. M. 48,—

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Mountains region. I have taken *Bibiocephala grandis*, Osten Sacken, flying over the River Pecos at Pecos, New Mexico.

The accompanying figure of *Phylorites* is from a photograph kindly made by Mr. W. W. Robbins, slightly touched up with India ink.

CURRENT NOTES.

By G. W. KIRKALDY.

1. HENDEL, F.: "Diptera—Fam. Muscaridæ, Subfam. Laxaninæ," 'Genera Insectorum,' fasc. 68, pp. 1-66, pls. 1-3 (1908).
2. HORVÁTH, G.: "Les relations entre les faunes hémiptérologiques de l'Europe et de l'Amérique du Nord," Ann. Mus. Hung. vi. 1-14 (1908).
3. KERTÉSZ, C.: "Catalogus Dipterorum hucusque descriptorum," iii. 1-367 + i (1908).
4. LONGSTAFF, G. B.: "Notes on some Butterflies taken in Jamaica," T. E. S. London for 1908, pp. 37-51, with map (June 5th, 1908).
5. MARTELLI, G.: "Contribuzioni alla biologia della *Pieris brassicæ*, L.," Boll. Lab. Zool. Portici, i. 170-224, figs. 1-12 (May 30th, 1907; Lepidoptera).
6. MARTELLI, SILVESTRI, and others: "Contribuzioni alla conoscenza degli insetti dannosi all'olivo e di quelli che con essi hanno rapporti," *op. cit.*, ii. 1-358, 187 figures (1907-8).
7. MASSI, L.: "Contribuzioni alla conoscenza dei Calcididi italiani," *op. cit.*, i. 231-95, figs. 1-47 (Nov. 29th, 1907; Hymenoptera).
8. Proceedings of the Hawaiian Entomological Society, vol. i. pp. 1-210, pls. 1-4, with 11 text-figs. (1906-8).
9. ROCCI, U.: "Contribuzione allo studio dei Lepidotteri del Piemonte," Bull. Soc. Ent. Ital. xxxviii. 52-79 (June 1st, 1907).
10. THEOBALD, F. V.: "A Monograph of the Culicidæ," vol. iv. pp. i-xix and 1-639, text-figs. 1-297, pls. i-xvi (1907; Diptera).
11. VERITY, R.: "Elenco dei Lepidotteri della Vallombrosa (Appennino Toscano) (800-900 metri)," Bull. Soc. Ent. Ital. xxxviii. 20-51 (June 1st, 1907).
12. VICKERY, R. A.: "A Comparative Study of the External Anatomy of Plant Lice," Rep. Ent. Minnesota, xii. 1-16, figs. 1-5 (May, 1908; Hemiptera).
13. WELLMAN, CR.: "Bionomische Beobachtungen an *Phonergates bicoloripes*, Stål" (July 1st, 1907; Hemiptera).

14. HORN, W.: "Brullé's '*Odontochila* aus dem baltischen Bernstein' und die Phylogenie der Cicindeliden" (Sept. 1st, 1907; Coleoptera).

Horn (14) divides the subfam. Cicindelinae (of the fam. Carabidae) into two phyla, viz., Allocosternaliae (with tribes Ctenostomini and Collyrini) and Platysternaliae (with tribes Cicindelini, Megacephalini, and Mantichorini).

Martelli (5) gives a very full account of the biology of the "large cabbage white," with that of its parasites, hyperparasites, &c. Verity (11) enumerates 456 species of Lepidoptera from Vallombrosa in the Tuscan Apennines, viz.: 77 Rhopalocera, 255 Macro-Heterocera, and 124 Micros. The list is annotated. Rocci (9) deals only with the butterflies of Piedmont, of which he enumerates 117; this list is also annotated, and is preceded by observations on the country. Longstaff (4) precedes his notes on Jamaican butterflies by topographical remarks and a map of the island.

Massi (7) presents an extensive and well illustrated contribution to the study of the chalcid flies.

Horváth (2) has summarized the interesting relations between the Hemiptera of Europe and North America. Thirty-three species—*Reduvius personatus*, *Climocoris lectularius*, two Chermidae, twelve Aphidae, and seventeen Coccidae—are common to both. The summary is as follows:—There exist a certain number of species and genera of Hemiptera common to Europe and North America. The great majority of these Hemiptera has originated in the palæarctic fauna, and belongs to the temperate zone. Their migration has mostly taken place by the Behring Strait. The few southern types common to the two continents have originated from intertropical regions, whence they have independently come to enrich the palæarctic and nearctic faunas. Artificial importation plays only a secondary rôle in the propagation of Europeo-American Hemiptera, but Europe has, by means of its cultivated plants, added more species to the American fauna than *vice versa*.

Vickery's notes (12) on the external anatomy of Aphidae may be interesting to British workers. Wellman (13) furnishes some biologic notes on an African Reduviid bug, which preys on a hut-infesting tick (*Ornithodoros*).

Silvestri and his assistants (6) have issued a very important work on the insects injurious to the olive. All orders are discussed very fully as regards their biology and anatomy.

Theobald (10) has issued a fourth volume on Mosquitoes, extending to over six hundred pages; he describes seventy-three new species. Hendel's "Genera" of the Lauxaniinae (better known as Sapromyzidae) is somewhat extensive, and will doubtless be very valuable to dipterists. The three coloured plates

are well executed (1). The third volume of Kertész's general catalogue of Diptera will be very welcome (3). It lists the species described up to the end of 1905, and embraces the Stratiomyiidae, Eriunidae, Cœnomyiidae, Tabanidae, Pantophthalmidae, and Rhagionidae.

The Hawaiian Entomological Society (8) have completed their first volume of Proceedings, in which all orders are discussed. This is the only entomological society outside Europe and North America to publish proceedings.

THE ATHALIA GROUP OF THE GENUS MELITÆA.

By GEORGE WHEELER, M.A., F.E.S.

(Continued from p. 249.)

PALPI.

Deione.—From above: Tip black, bare, and claw-like; orange-brown hairs on top and sides to two-thirds of length; pale hairs showing below the orange-brown.

From below: Black, nearly covered with pale hairs to two-thirds or three-quarters of the length; orange-brown hairs almost to the tip.

Athalia.—From above: Black, so sparingly clothed in the upper portion with orange-brown hairs as to leave the general appearance quite dark.

From below: Black, but thickly covered with pale hairs till near the tip, where they become orange brown. The shade of the pale hairs varies greatly, from almost white to a light orange-brown.

Parthenie.—From above: Black, but so densely covered with orange-brown hairs that the general effect is orange-brown.

From below: Black, with pale hairs to about half the length, not very dense, and thence orange-brown to the tip.

Varia.—From above: Very densely clothed, as in *parthenie*, but with hair so much darker that they appear almost as dark as in *athalia*, though from an opposite cause.

From below: Black, clothed throughout in the male with orange-brown hair, but in the female the hair near the base is pale.

Aurelia.—From above: Black, less thickly clothed than in *parthenie*, with hair of a darker shade, as in *varia*. The general effect is considerably darker than in *parthenie*.

From below: Black, with darkish orange-brown hair, and some pale hairs at the base in the female, but not in the male. The palpi of *aurelia* and *varia* have the closest resemblance of any.

Britomartis.—From above: Black, very sparingly clothed, even in the freshest examples, with very dark orange-brown hair. The palpi are short.

From below: Black, clothed to the tip with short pale hairs, giving the effect of a black streak between two nearly white lines.

Dictynna.—From above: Black, fairly well clothed with darkish orange-brown hairs.

From below: Black or nearly black, with orange-brown hairs up the centre, and lighter, sometimes quite light, ones at the sides; the light hairs not reaching to the tip.

Asteria.—Short. From above: Black, very thickly clothed with dark brown hair.

From below: The same, with a few pale hairs on the inner side of the base in the male, and on both sides of the base and further up the inner side in the female.

ANTENNÆ.

Deione.—Black above, orange below, the orange being extended over the tip on to the upper side. Each joint is edged with white, which sometimes makes a white line between the black and the orange. The depth of the orange colour varies greatly.

Athalia.—Black above, the joints barely outlined in white; whitish below, becoming yellow-brown towards the tip, this colour only very slightly turning over on to the upper side. The whitish coloured portion is much narrower than the orange in *deione*. Occasionally the yellow-brown extends almost to the base of the antennæ.

Parthenie.—Brownish black above, the joints as conspicuously edged with white as in *deione*, making the dark line narrow; orange-brown below, much darker than in *athalia* or *deione*, this colour only very slightly, often not at all, turning over the dark side of the tip.

Varia.—Much less conspicuously edged with white than in *parthenie*, especially in the male, and even darker below; a small white patch at one side of the tip.

Aurelia.—Dark brown above, with white edge; a large white patch at the side of the tip. Darker even than *varia* below, but lighter orange-brown, though still dark, towards the tip. This colour, even when showing on the upper side, does not look as if it were folded over from below.

Britomartis.—Very like *athalia*, but the under surface lighter, frequently white, and the white runs right up into the tip, which is edged with orange-brown.

Dictynna.—Black above, distinctly ringed with white; pale yellow or nearly white below, the white sometimes running up almost to the end of the tip, which is red-brown or orange-brown, this colour showing also on the upper side of the tip.

Asteria.—Black throughout above, the joints slightly and occasionally strongly indicated with white at the edge; below, black or very dark brown, occasionally with white near the base and at the side of the tip, rarely showing any orange-brown at the tip.

There are still three other considerations to be taken into account with regard to the perfect insect, even apart from neuration and the male armature, namely, size, locality, and date. Of these the first, though of some slight general value, is quite useless in any doubtful case apart from the other two. In the cases especially of *athalia* and *dictynna*, the variation in size,

though both may be regarded as single-brooded, is very great. In *deione* the difference between the two broods is often considerable, and in *britomartis*—at least as represented at Reazzino—it is most striking. In *parthenie* (apart from *varia*, which, so far as I see at present, there is no reason for connecting with it) the difference in size between the two broods is not, in my experience, considerable, but I have seen no specimens that are undoubtedly North German of the second brood (the mere label “Germania” being almost worse than useless); so that, in the face of Borkhausen’s description and Godart’s illustration, it would be unreasonable to make a general statement to this effect. Speaking somewhat loosely, it may be said that *asteria* is the smallest species, then *varia*, and that *aurelia*, *britomartis*, *parthenie*, *athalia*, *deione*, and *dictynna* follow in this order; but this must in no sense be taken as a rule, except in so far as that if hundreds of examples of all the species were measured, the average would probably come out in that order; but in individual cases the exceptions would be so multitudinous that size alone is most untrustworthy as a guide. Speaking generally, it may be said that in any given species the longer the feeding-time of the larva the larger the resulting imago (though even this must be qualified by taking into consideration the nutritive qualities of the food attainable), and hence it follows that in double-brooded species of this genus, the spring brood, whose larvæ feed both in autumn and spring, is generally larger than the autumn brood, which has to get through all its phases in two or three months, or even less. This is strikingly illustrated by the cases of *parthenie*, *berisalisensis*, and *britomartis* in Switzerland. There is little difference between the two broods of the first-named species, the second brood of which begins to feed when the plantains are still fairly young and juicy, and which has about ten weeks of larval life; the difference is greater in *berisalisensis*, the first brood of which does not generally appear till two or sometimes even three weeks later than *parthenie*, the second broods being nearly contemporary; whilst in *britomartis*, the larval life of whose second brood cannot extend beyond five weeks at most, the difference is very great, the first brood being generally as large as the average *parthenie*, and the second sometimes as small as the smallest *asteria*. When *aurelia* is partially double-brooded, south of the Alps, as at Roveredo, the few second-brood specimens that I have found have been no larger than *asteria*, and the small size of September *athalia*, when that species ventures on a partial second brood, is a matter of common knowledge. It follows also from this that the higher the altitude to which a single-brooded species mounts, the smaller will the specimens become, whereas, if a double-brooded species mounts high enough to become single-brooded, the tendency of the specimens will be towards increase in size,

until it arrives at an elevation which, by giving a shortened time for the growth of the larva by the late melting of the snows, or by decreasing its nourishment by stunting the food-plant, again dwarfs the species down to, or below, the average of the plains.

(To be continued.)

A SMALL COLLECTION OF SWISS NEUROPTERA.

By W. J. LUCAS, B.A., F.E.S.

With his usual kindness Dr. Chapman handed over to me the Neuroptera he took in Switzerland in July and August of the past summer. Though few in number there were amongst them representatives of four of the neuropterous suborders.

PERLIDIA.—*Dictyopteryx alpinæ*, two specimens, Saas-Fée, 19th to 31st July.

ODONATA.—*Sympetrum striolatum*, one female, Zermatt, 9th to 16th August. *S. fonscolombii*, three males, Zermatt, 9th to 16th August.

PLANIPENNIA.—*Panorpa vulgaris*, one female, Glion, 2nd to 5th July; also one male and three females, Vissoye, 7th to 17th July; *P. vulgaris*, which is common in Switzerland, is structurally only a form of our *P. communis*. *Ascalaphus coccajus*, two females, Saas-Fée, 19th to 31st July.

TRICHOPTERA.—*Drusus nigrescens*, one, Saas-Fée, 19th to 31st July. *Sericostoma pædemontanum*, one, Saas-Fée, 19th to 31st July.

Mr. K. J. Morton kindly assisted with some of the identifications. But one species, *Sympetrum striolatum*, is represented in Britain.

NOTES AND OBSERVATIONS.

RHODOMETRA (STERRHA) SACRARIA IN SOUTH DEVON.—The specimen recorded by Mr. H. M. Edelsten (*antea* p. 250) is a male and not a female, as there stated. The mistake arose in the press.

ANGERONA PRUNARIA IN SEPTEMBER.—One individual of a brood of eighty larvæ, reared from eggs laid by a bred female in early June last, became full grown and spun up about September 15th. A female moth emerged on September 28th. All the other larvæ remain of the normal size for the time of year, and will no doubt hibernate in due course.—J. B. MORRIS; 14, Ranelagh Avenue, Barnes.

NONAGRIA NEURICA IN BRITAIN.—During July we captured in Sussex a *Nonagria* which we at first believed to be *arundineta* and recorded as such in August 'Entomologist,' but upon a closer examination, not finding the specimens to agree with those from Kent, Cambs, and Norfolk, we sent them to Mr. Edelsten, who replies

"that the specimens agree with the insect known on the Continent as *N. neurica*, Hb., a species which is quite distinct from *N. dissoluta* and its var. *arundineta*. *N. neurica*, Hb., occurs in parts of Germany, &c., but this is apparently the first occurrence of this insect in Britain."—E. P. SHARP & A. J. WIGHTMAN; Lewes.

LATE EMERGENCE OF *ÆSCHNA CYANEA*.—I have to record another late emergence of a dragonfly. An *Æschna cyanea* emerged early in the morning of September 7th. Of many bred this summer the earliest came out on June 13th; there was then an interval of a fortnight. After that they appeared in rapid succession until about the end of the first week in August. No more came out after then till that late lingerer on September 7th, born entirely out of due season. HAROLD HODGE; 322, Oxford Street, W., October, 1908.

NOTE ON *ABRAXAS SYLVATA*, AB.—I was struck with the general resemblance of the aberration of *A. sylvata* (*ulmata*) figured in the last number of the 'Entomologist,' its blurring and suffusion, to the appearance presented by some geometrid moths whose pupæ have been exposed to abnormally low temperatures. This led me to find what temperature the specimen taken by Mr. Scollick, as you inform me, on the 22nd June, 1907, must have been subjected to while in the latter part of its pupal stage. I have access to the Brighton official temperatures and find that the June of 1907 was the coldest certainly for thirteen years. May was also considerably below the average, especially the last half of it. In Buckinghamshire, where the specimen figured was taken, the temperature was probably lower, that being an inland county. Different species vary greatly in their sensitiveness, so far as it is exemplified by their facies, to pupal cold; I do not know how *sylvata* ranks in this respect, and a species which, like this, has a winter pupa, is usually less sensitive than one which has come from a summer pupa, so that I by no means put forward the theory that the cold May and June of 1907 were the cause of the abnormal appearance figured—only there seems a possibility of it. F. MERRIFIELD; 14, Clifton Terrace, Brighton.

EUPITHECIA LARVÆ ON PASTINACA: A CORRECTION. — Mr. Percy C. Reid informs me that the larvæ which he found on *Pastinaca sativa*, and took to be those of *Eupithecia pimpinellata* (Ent. Rec. xx. 13; Entom. xli. 54) proved to be *E. scabiosata*, well known to be a pretty general feeder, though I do not at the moment remember that parsnip has hitherto been recorded as one of its food-plants.—LOUIS B. PROUT; 246, Richmond Road, N.E., October 26th, 1908.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA IN CORNWALL.—I have not seen so many *Colias edusa* for very many years as I saw during the first ten or twelve days of this month flying over the towans, both on the Lelant and the Hayle side of the estuary of the Hayle river. I was in this part, on and off, from September 8th until October 12th, but I did not see a single *C. edusa* until October. Generally, I noticed more insects, in-

cluding *Macroglossa stellatarum* and *Pyrameis cardui* for the first time this season, in the first weeks of October, than in the whole summer previously. In fact this seemed to be the true summer. HAROLD HODGE; October 19th, 1908.

COLIAS EDUSA AT LEATHERHEAD, SURREY.—A neighbour of mine brought me yesterday a male *C. edusa* he had caught with his hat in a field here. Needless to say it was very worn.—JOSEPH H. CARPENTER; Redcot, Belmont Road, Leatherhead, October 4th, 1908.

ACHERONTIA ATROPOS AT RINGWOOD.—A fine perfect male specimen of this hawk-moth was brought to me on the 10th inst. by a lad who had found it in his father's garden.—CHAS. J. BELLAMY; Broadshard Cottage, Ringwood, October 11th, 1908.

ACHERONTIA ATROPOS IN INVERNESS-SHIRE.—Mr. Grant, Drumalan, Drumnadrochit, has sent me a specimen of *Acherontia atropos*, which was picked up on the road in the village of Milton, near Drumnadrochit, on September 28th. It was dead when found. The specimen is a large one.—HENRY H. BROWN; Cupar-Fife.

ACHERONTIA ATROPOS IN MIDDLESEX.—Mr. Broughton Edge, the Revising Barrister for the Hammersmith district, informs me that a specimen of this moth, taken in the neighbourhood, was brought into his Court during the September sittings, and shown him by the captor.—H. ROWLAND-BROWN; Harrow-Weald, October 24th, 1908.

SPHINX CONVULVULI AND *ACHERONTIA ATROPOS* IN SELKIRK.—A specimen of each of these noteworthy moths was brought to me yesterday, both having been caught in the town. *S. convolvuli* was found behind a rain-pipe on the ground. It had lost a fore-leg, but was otherwise in good condition and lively. *A. atropos* was found creeping up a chimney-stack. It had been handled a good deal before I got it, and was somewhat worn.—B. WEDDELL; Selkirk, October 23rd, 1908.

PYGERA ANACHORETA, &c., IN ESSEX.—Referring to Mr. George P. Kitchener's note in last month's 'Entomologist,' on capturing a female *P. anachoreta* in Essex, I would like to call attention to an error on his part in saying the only records he can find of former captures have been on the Kentish coast, as my find of wild ova of this species at St. Leonards-on-Sea, Sussex, in August, 1893, was duly recorded in the 'Entomologist' after the larvæ had pupated. I may mention that this brood was kept up by myself and friends for nine years, when it became exhausted.—MISS A. D. EDWARDS; The Homestead, Coombe Hill, East Grinstead, October 17th, 1908.

CARADRINA EXIGUA AT CHESTER.—A specimen of *C. exigua*, in fine condition, rewarded my search at the foot of the electric lamps on the night of October 12th. This species was first recorded at Chester by Dr. Herbert Dobie, who took a specimen at the electric lamps in 1900. The second record fell to my share, September 25th, 1903.—J. ARKLE; Chester.

DASYPOLIA TEMPLI AT CHESTER.—I took a fine male at rest on the city wall near an electric lamp, October 6th, 11 p.m. This makes

my third capture of the species at the Chester electric lights. J. ARKLE; Chester.

LABIA MINOR IN THE CITY.—A male example of this earwig settled on my hand in London as I was walking along Southwark Street near Blackfriars Bridge on Wednesday, September 30th last. Mr. W. J. Lucas was good enough to name it for me and I have added it to his collection, the interest attaching to it being the locality in which it was taken.—F. M. DYKE, B.Sc., Kingston-on-Thames.

CAPTURES OF LEPIDOPTERA IN WEST CORNWALL, 1908.—Of *Leucania albipuncta* I have this season taken three specimens, two in grand condition and one slightly worn; and of *Apamea leucostigma* (*fibrosa*) a single specimen in very good condition. I believe these to be the first published records for this county. Half a dozen very fine *Leucania vitellina* and several fine *Polya xanthomista* = *nigro-cincta* have also been secured. *Cobias edusa* has been scarce, but I have captured five or six specimens, and have seen about two dozen others. Two other insects perhaps worth mentioning are *Sphinx convolvuli* and *Acherontia atropos*, of each of which I have obtained one example.—W. A. ROLLASON; Lamorna, Truro, Cornwall, October 17th, 1908.

ZIZERA (CUPIDO) MINIMA IN AUGUST.—During the first week in August the second brood of *Z. minima* was locally common on Salisbury Plain.—F. W. J. JACKSON; Woodcote End House, Epsom.

NOCTUA DITRAPEZIUM A SCOTCH SPECIES.—A very fine specimen of this moth was taken at sugar at Fortrose, in the Black Isle, in August, 1903. I was not aware until a few days ago that this species has not hitherto been regarded as extending its range so far north. I certainly have never taken it in Scotland since, nor can I learn from friends north of the Tweed of any other Scotch record. The only books of reference that I have at hand limit its distribution to England.—R. MELDOLA; Lyme Regis, September 15th, 1908.

[Since writing the above I find that Barrett gives Monieriff Hill, Perthshire, among the localities for this species. Its occurrence at Fortrose on the shore of the Moray Firth is, however, worthy of record.—R. M.]

NOTES ON COLLECTING IN THE ALDERSHOT DISTRICT.—To most people the word Aldershot conjures up visions of soldiers and field days over the Long Valley rather than of entomological expeditions. The Long Valley truly is a terrible place, where not even a cabbage white nor a meadow brown can keep up the struggle for existence. On that desolate sandy waste I would be more surprised to see a butterfly than a vulture, for on a broiling hot day the valley reminds one of a tropical desert, and it would only require the vulture to complete the resemblance. Luckily, however, the Long Valley is of limited extent, and all around it lie districts that are more favoured entomologically than any others that I know of, except perhaps Dover. Taking Aldershot as a centre, and using a bicycle as a means of conveyance, five distinct types of country can be reached in an

easy day's excursion, viz., miles of fir woods, acres of heather land, extensive oak woods, chalk hills, and the ordinary field and hedgerow country. All these districts produce their own peculiar fauna in abundance. I have only been one year in Aldershot, and during that time I have really had very little leisure for entomological expeditions. Modern soldiering at Aldershot requires that one shall devote all one's time and energy to it. On the other hand, when carrying out military training one traverses a large expanse of country, and lines of troops in extended order will make almost any insect move out of heather and woods. My experience, therefore, of the lepidopterous fauna of the Aldershot district has been more that of observing than collecting. I cannot collect numbers of any insect, as it would not be possible for me to carry cabinets all over the world, and also I am very much against the practice of collecting "series." I often read with dismay in the 'Entomologist' how So-and-so caught "a nice series" of some dozens of a rare insect. Soon half the butterflies and moths of the British Isles will become extinct if collectors go on amassing "series." One wonders why the various entomological societies do not protest against this type of wholesale slaughter. But I must return to the butterflies and moths that I have come across whilst riding about, and which have come to the sugar patches which I always keep going in my garden.

Of butterflies I have met with thirty-six species. Six other species, including *Apatura iris*, occur occasionally, I have heard, and I hope to obtain them next season. Of those species that I myself saw, *Argynnis paphia* swarmed in some woods, *A. selene* and *A. euphrosyne* were fairly common, and *A. aglaia*, also *A. adippe*, were met with. *Limenitis sibylla* was very numerous. One day whilst riding through a wood I counted four white admirals on one small blackberry bush. I also came across this insect, quite close to Aldershot town, engaged in the rather peculiar pursuit, for it, of sailing about in glaring sunshine over a small pond, occasionally resting on the water-lily leaves. The pond was of course in a wood. *Satyrus semele* swarms everywhere, and *Epinephele tithonus* is equally common. *Zephyrus quercus* was plentiful in all oak woods, and *Lycaena astrarche*, *L. corydon*, *Cupido minima*, and *Cyaniris argiolus* all occurred freely in the right spots.

The list of moths noticed would be too long to enumerate. All the commoner species seem to abound, and no doubt, had I the time available in which to work the district systematically and breed larvæ, I could obtain all the Macro-Lepidoptera, except those species which are peculiar to the north, the fens, or the coast. Of local or rare species I have come across the following:—*Uemaris bombyli-formis*, *Hylophila bicolorana*, *Nola confusalis*, *Cochilidon limacodes*, *Drepana binaria*, *P. dictæoides*, *Acronycta leporina*, *Nonagria typhæ*, *Apamea unanimitis*, *A. ophiogramma*, *Plusia moneta*, *Erastia fuscata*, *Hadena genisteæ*, *Calymnia pyralina*, *Aporophila nigra*, *Agrotis vestigialis*, *Orrhodia rubiginea*, *Xylina semibrunnea*, *Epione apiciaria*, *M. unangulata*, *Anticlea rubidata*, *Coremia quadrifasciaria*, *Boarmia consortaria*, *Tephrosia extersaria*, and *Colletes sparsata*. Of these *C. pyralina* seems to have its headquarters in my orchard. If I were a "series" collector, I could have taken a couple of dozen this

summer. I bred one from a caterpillar I found on a pear-tree. *Aporophila nigra* and *Agrotis saucia* have been very common. *B. consortaria* and *D. hamula* came to sugar in the garden. *P. dictæoides* I have found on tree-trunks. *Agrotis vestigialis* is really a coast insect, but I found a fine dark specimen one day inside a tent on one of the heather districts.

During the latter part of August, searchlight operations were carried on on the Chobham Ridge. Now this ridge is a heather and fir-tree clad hill some three miles long, whence a view can be obtained from Sunningdale on the north to Guildford on the south, and beyond Weybridge towards Croydon on the east. No light was turned on until 9.30 p.m. My duties happened to bring me alongside one of the searchlights, one using a fixed beam. The sight was so extraordinary that even the men working the lights made remarks upon it. From every side dozens of moths came sailing into the light area. At a short distance off they all appeared white, just like a number of swiftly moving snowflakes. Few, however, came directly towards the light, and fewer still gave me any opportunity to discover the species they belonged to. Of those, however, that I could identify, the majority of the Geometers were *P. hippocastanaria*; whilst the Noctuas were either *A. tritici*, *A. obeliscæ*, or *A. agathina*, but which I could not be certain about, as I had no means of capturing or killing any to enable me to examine them closely. It was decidedly a night of lost opportunities. Once before in my life have I experienced a similar disappointment, and that was during the South African war when I found myself after a night march at the outlying portions of the N'Gome Forest on the Zululand border, where the air seemed to be alive with various species of *Papilio* and *Charaxes*, none of which I could catch, as a butterfly-net and a large killing-bottle are not part of the outfit of an officer in the Mounted Infantry!—B. TULLOCH (Captain, King's Own Yorkshire Light Infantry): Aldershot, October 12th, 1908.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—Wednesday, October 7th, 1908.—Mr. C. O. Waterhouse, President, in the chair. Mr. James J. Joicey, of 62, Finchley Road, London, N.W., and Mr. Robt. M. Prideaux, of Woodlands, Brasted Chart, Sevenoaks, were elected Fellows of the Society.—Mr. W. G. Sheldon brought for exhibition a case containing butterflies from Andalusia taken in the spring of this year, as described in the 'Entomologist, with the striking aberration of *Melanargia ines*, showing a strong melanic tendency.—Dr. Herbert Charles showed a remarkable aberration of *Dryas paphia* taken by him in the New Forest in July last. With the exception of the borders and the bars all the wings were suffused with deep velvety brown triangular patches, the maculations being entirely absorbed therein.—Mr. Hugh Main showed living larvæ of *Blatta germanica* to illustrate their colourless condition on first emergence.—Mr. H. St. J. Donisthorpe exhibited examples of (a) *Agrius biguttatus*, F.,

taken in Sherwood Forest, July, 1908, being the first record for the Midlands; (b) *Pyropterus affinis*, not uncommon in Sherwood Forest, July, 1908; (c) a species of *Phora*, with pupæ bred from larvæ which came out of the body of a *Clerus formicarius* taken alive in Sherwood Forest, July, 1908, with the *Agrius*, and probably parasitic on it; (d) *Troglolimus anglicanus*, Shp., a specimen taken at Bembridge, August 3rd, 1908, with a specimen from Plymouth, and only known before to occur in New Zealand, and at Plymouth where it was discovered by Mr. Keys; (e) *Phyto melanocephala*, Mg., bred from woodlice taken at Bembridge, Isle of Wight, August, 1908, with pupa, and a wood-louse with dipterous pupa *in situ*. The life-history of the fly was hitherto unknown, though the larvæ of *Rhinophora atramentaria*, Mg., a nearly related species, have been recorded as parasitic on *Oniscus asellus*.—Mr. A. H. Harrison, a gynandromorphous example of *Pieris napi*, bred from parents taken in North Cornwall this year.—Mr. E. R. Speyer, a case of rare and interesting dragonflies taken in the British Isles in 1908, including (a) *Sympetrum fonscolombii*, Selys. A male and female, taken in Hertfordshire on June 24th and July 27th respectively, the last specimens of this dragonfly recorded from the British Isles being those taken by Mr. Briggs in Surrey in 1892; (b) *Somatochlora metallica*, Lind., a male captured in Sussex on August 4th, being the first authentic record of this insect in England; (c) *Anax imperator*, Leach, a male caught in Hertfordshire with *Libellula depressa*, male, in its jaws; (d) *Libellula depressa*, Linn., two females taken late in the season, showing the appearance of blue powder on the abdomen; (e) *Libellula quadrimaculata*, Linn., four specimens, showing the remarkable difference in the amount of suffusion on the wings in individuals from the same locality, together with the following insects:—*Orthetrum cancellatum*, McLach., male and female, from Herts; *Cordulia aenea*, Linn., male, from Burnham Beeches, Bucks; *Brachytron pratense*, Müll., male and female, from Oxford; *Platycnemis pennipes*, Pall., male and female var. *lactea*, from Oxford; *Erythromma najas*, Hansem; specimens from Herts, Bucks, Sussex; and *Pyrrhosoma tenellum*, McLach., male and female, from Sussex.—Mr. H. M. Edelsten showed specimens of *Æschna isosceles* and *Libellula fulva* from Norfolk Broads, taken in June last, and *Orthetrum cærulescens* from Chagford, taken in July.—Mr. Norman Joy exhibited a number of examples of Coleoptera new to the British list, including *Orypoda perplexa*, Muls., from Cornwall; *Sunius lyonessius*, Joy, and *Cryptophagus hirtulus*, Kr., from the Scilly Isles; *Anisotoma flavicornis* Bris., and *Corticarius linearis*, Payk., from Bradfield.—Mr. W. J. Lucas exhibited a spike of the grass *Molinia cærulea* with dead Syrphids, *Melanostoma scalare*, Fabr., attacked by the parasitic fungus *Empusa muscæ*, found on Esher Common, October 3rd, 1908. Most were attached by the point of the head only in a very peculiar manner, and apparently all were females.—Mr. O. E. Janson exhibited a specimen of *Cryptomorpha desjardinsi*, Guér., found by Mr. F. C. Selous in his house at Barton-on-Sea, Hants, on June 26th. This beetle is recorded as living on banana-plants in Mauritius and Madeira, and may have been introduced here with the banana-fruit.—Mr. G. C. Champion, on behalf of Mr. W. West, who was present as a visitor, exhibited

specimens of the following insects:—*Aleochara crassiuscula*, Sahlb., taken at Great Yarmouth in May, 1908; varieties of *Donacia dentipes* and *D. simplex*, from Caistor Marshes; *Nabis boops*, Schiödte, taken at Esher, in August, 1908; and *Idiocerus scurra*, Germ., taken at Blackheath, Kent, in September, 1908.—Mr. L. W. Newman brought for exhibition specimens of (a) *Crymodes exilis* from the Shetlands, including the rare female, (b) *Callimorpha dominula*, two yellow aberrations bred from East Kent ova. In 1906 a yellow female was bred. This was paired with a typical red male, and the result in 1907 was that the whole brood were typical Reds. These Reds were paired, and in 1908 the brood (a small one) produced 25 per cent. of the yellow form; (c) a varied series of *Camptogramma fluviata* from Eastbourne; and (d) a yellow aberration of *Noctua rubi*, from Yorkshire.—Dr. F. A. Dixey exhibited a number of Central and South American butterflies belonging to six different subfamilies, but all showing the same obvious character of a diagonal reddish band on a general dark surface. He stated, in reference to some remarks made by Mr. W. J. Kaye on a previous occasion, that although there was no direct geographical continuity between the areas of distribution of several of the species shown, there appeared to be sufficient connection of an indirect kind to warrant the supposition that the whole constituted an assemblage of mimetic character. The following papers were read or communicated:—"Bionomics of Butterflies," by Dr. G. B. Longstaff, D.M. "Some Additions to the Perlidæ, Neuroptera-Planipennia and Trichoptera of New Zealand," by L. J. Hare, F.E.S. "On the Larvæ of *Hamanumida dædalus*, Fab., *Hoplitis phyllocampa*, n. sp., and *Sulophonotus myrmeleon*, Feld, with Descriptions of the Imagines of the two Heterocera," by Roland Trimen, F.R.S. "A Revision of the Australian and Tasmanian Malacodermidæ," by A. M. Lea, F.E.S., Government Entomologist, Tasmania.—H. ROWLAND-BROWN, M.A., Hon. Secretary.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—September 10th, 1908.—Mr. Alfred Sich, F.E.S., President, in the chair.—Messrs. Harrison and Main exhibited a series of bred *Macaria liturata* var. *nigrofulvata* from Delamere ova. Of the fourteen specimens bred, thirteen were of the dark form.—Mr. Newman, varieties of *Abraxas grossulariata*, including ab. *varleyata*, ab. *nigrosparsata*, dark forms, and a rayed specimen; a very darkly powdered *Selenia illustraria*; two *Gnophos obscurata* var. *mundatu* from Lewes; a rayed form of *Pieris napi*; a yellow aberration of *Noctua rubi*; and a long bred series of *Arynnus aglaia* with much variation.—Mr. Turner, a fine female of *Euvanessa antiopa* taken at Vitznau on August 10th, and a well-marked and brilliant female under side of *Erebia æthiops* taken at Gersau on July 27th.—Mr. Hall, an abnormal flower of the sweet pea, having six parts and all separate, without a "keel."—Mr. Noad Clark, photomicrographs of the ova of *Coleophora virgaureæ* laid on the pappus hairs of *Solidago virgaurea*. They were upright eggs, and the young larvæ emerged from the micropyle.—Mr. Step, a *Diloba cæruleocephala* bred by his son, in which the "80" mark was blurred and extended.—Mr. West (Greenwich),

specimens of *Aleochara crassiuscula*, a Colcopteron new to Britain, discovered by him at Great Yarmouth; and also the rare and local Homopteron *Ideocerus scurra* from Blackheath on poplars. — Mr. Moore, a larva of *Acronycta psi* having an unusual development of the fleshy "horn." — Mr. Step, photographs of fungi recently obtained near Ashstead, including *Clavaria cristata*, *Polyporus acanthoides*, &c. — Mr. Sieh, larvæ of *Aristotelia hermunnella* mining a leaf of *Chenopodium album*, and referred to its colour changes.

September 24th.—The President in the chair.—Dr. Chapman exhibited a dark suffused specimen of *Brenthis pales* from Saas-Fée, and an example of *Anthrocera exulans* var. *flava* from the same locality.—Mr. Step, a number of photographs of fungi taken during the Society's Field Meeting at Claygate.—Mr. Lucas, the two rare fungi, *Trametes rubescens* and *Armillaria mellea*, from the New Forest; and also a specimen of *Chirocephalus diaphanus*, a very beautiful crustacean, found in water in a pool at Claygate during the Field Meeting.—Mr. Cowham, an example of *Ophiodes lunaris* bred in July, 1907, from an ovum sent him from South France by Dr. Chapman.—Messrs. Harrison and Main, a long series of *Eupithecia absinthiata* bred from larvæ collected on ragwort near Cork.—Mr. Newman, long series of *Agriades corydon* taken near Dover, including var. *obsoleta* and many blue females; many blue females of *Polygonommatus icarus* from North Kent; and two striking forms of *Dicranura vinula*, one very dark, almost chocolate, suffused, the other having the zigzag lines unusually cleanly cut and dark, the middle area being very light.—Mr. Ashdown, a large number of Lepidoptera met with during a trip to Switzerland in July, 1908, including *Pieris daphnidice*, *Thecla w-album*, *T. ilicis* ab. *cerri*, *Polygonommatus doris*, *Lycæna arion*, *L. orion*, *L. pheretes*, *L. damon*, *Melitæa parthenie*, *Æneis aëlle*, *Satyrus cordula*, *Pararge achine*, *Thyris fenestrella*, *Cleogene lutearia*, *Psodos coracina*, &c.—Mr. Moore, Lepidoptera from Northern Nigeria.—Mr. West (Ashtead), a fine specimen of the rare Hydroid Zoophyte, *Thuraria thuja*, from Scarborough. — Mr. Coote, living larvæ of *Celastrina argiolus*, including one example which had been of an obscure red colour through all its instars. — Mr. Sieh, *Parnassius apollo*, the imago bred from the larva exhibited at a previous meeting, and made remarks on the differentiation of the larva from that of *P. delius*.

October 8th.—The President in the chair.—Mr. Ashdown exhibited about seventy species of Coleoptera, Hemiptera, &c., taken by him in July, 1908, in Central Switzerland, including *Trichius fasciatus*, *Tricodes apicarius*, *Eidemera podagraria*, *Leptura rubra*, *Clytus massiliensis*, *Strachia ornata*, *Edipoda cærulescens*, &c.—Mr. Tonge, two bred specimens of *Aphantopus hyperanthus* ab. *cæca* from Surrey; and a bred specimen of *Melanargia galathea* var. *procida* from Hampshire.—Messrs. Harrison and Main, a bred series of *Pseudoterpnæ pruinata* (*cytisara*) from Epping Forest, showing great variation in the size, distinctness, and presence of the usual submarginal light-coloured line. — Mr. Newman, a bred series of *Malacosoma castrensis* from Essex, including the rare yellow unicolorous female, and the dark chocolate male; a bred series of *Ægeria andreniformis* from

North Kent, where it was much subject to the attacks of ichneumons; a series of *Hepialus humuli* var. *hethlandica* and a few *Pachnobia hyperborea* from Shetland; some *Anarta melanopa* from Rannoch; a second brood bred, *Abraxas grossulariata* October 8th, the first to emerge from over one hundred pupæ; a living *Thera firmata*, second brood; and a living second brood specimen of *Eumorphia elpenor*.—Mr. R. Adkin, recently deposited ova of *Tortrix pronubana*.—Mr. J. P. Barrett made a comparison of the lepidopterous fauna of North Kent thirty years ago and that of to-day, illustrating his remarks by series of *Aporia cratægi*, *Nonagria sparganii*, *Acidalia ochrata*, *Agrotæa nemoralis*, *Tapinstola bondii*, *Eremobia ochroleuca*, &c.—Mr. South, on behalf of Mr. Waller, a female *Trichiura cratægi* with one antenna male. He also showed an *Epinephele jurtina* (*ianthina*) from Box Hill with symmetrical, pallid, internervular spaces; and a short series of *Rhodophæa suavella* reared from larvæ collected from sloe at Eastbourne.—Mr. Main, a living "stick" insect bred from the ovum shown in the spring.—Mr. Sich, bred *Gillmeria pallidactyla* from Byfleet.—H. J. TURNER, *Hon. Rep. Sec.*

RECENT LITERATURE.

On the Mouth-parts of some Blattidæ. By J. MANGAN, B.A. 'Proceedings of the Royal Irish Academy,' vol. xxvii. Sect. B, No. 1. 1908.

No one interested in the cockroaches in general, and the British species in particular, can well be without this most useful paper, which is illustrated by three excellent plates. It is published separately by Hodge, Figgis and Co., Dublin.—W. J. L.

Subfam. Decticinae of Fam. Locustidæ of the Orthoptera. Fascicle 72 of the 'Genera Insectorum,' published under the direction of P. Wytsman, Brussels. 1908.

THIS part, with two fine plates, is from the pen of the well-known American orthopterist, A. N. Caudell. In the long list of species enumerated occur five British species, some of which are, however, rather difficult to find under their new names:—*Tettigonia* (*Decticus*) *verrucivora*, *Pholidoptera griseoptera* (= *Thamnotrizon cinereus*), *Metrioptera albopunctata* (= *Platycleis grisea*), *M. (P.) brachyptera*, and *M. (P.) roeselii*.—W. J. L.

Subfam. Nyctiborinae of Fam. Blattidæ of the Orthoptera. Fascicle 74 of the 'Genera Insectorum.' 1908.

THIS small part (with one beautiful coloured plate), written by Mr. R. Shelford, M.A., deals with a subfamily of cockroaches which contains no genuinely British species, though one, *Nyctibora brunnea* (= *N. holosericea*), has occurred here once or twice casually.—W. J. L.

Additions to the Wild Fauna and Flora of the Royal Gardens, Kew.

VIII. 'Bulletin of Miscellaneous Information,' No. 7. 1908.

IN this Bulletin Mr. A. L. Simmons has added a considerable number of species to the Macro-Lepidoptera (with Tortricina) of the fauna of the Gardens, while Mr. A. Sieh has been equally successful with the Micro-Lepidoptera. The list is of general interest, as notes accompany the insects referred to. The repeated occurrence of the name of the late Mr. G. Nicholson reminds us of a place that will not easily be filled in this labour of love in connection with the Gardens.—W. J. L.

Twenty-eighth Annual Report of the Entomological Society of Ontario for 1907. Published by the Ontario Department of Agriculture, Toronto. 1908.

THIS Report evidently fulfils the double purpose of giving an account of the doings of the Entomological Society and furnishing a report on entomology as practically connected with agriculture in the province. In some one hundred and forty pages will be found a mass of most useful information. The paper on which it is printed is rather poor; and the illustrations are somewhat crude, though they are not necessarily less useful on that account.—W. J. L.

OBITUARY.

THE 'Times' for September 24th last contained an obituary notice of the late Mr. GEORGE NICHOLSON, F.L.S., who passed away in September at Richmond, to the great regret of all botanists, and also of those entomologists who have been associated with him in investigating the insect fauna of the Royal Botanic Gardens at Kew. Mr. Nicholson was known universally as a botanist and horticulturist, and most lovers of gardens will be acquainted with his large work, the 'Illustrated Dictionary of Gardening.' He had studied in France, travelled much on the Continent and in America, and knew most of the great gardens of England, as his advice was frequently asked concerning them. For some fifteen years he was Curator of Kew Gardens, and after his resignation of that appointment, owing to failing health, he still took a very keen interest in the Gardens, and busied himself especially with working out the wild fauna and flora of the Gardens. As the lists, published from time to time in the Kew 'Bulletin,' will show, he was not only successful himself, but also infused great enthusiasm into those whose aid he sought in determining the species of the fauna with which he was not specially acquainted.

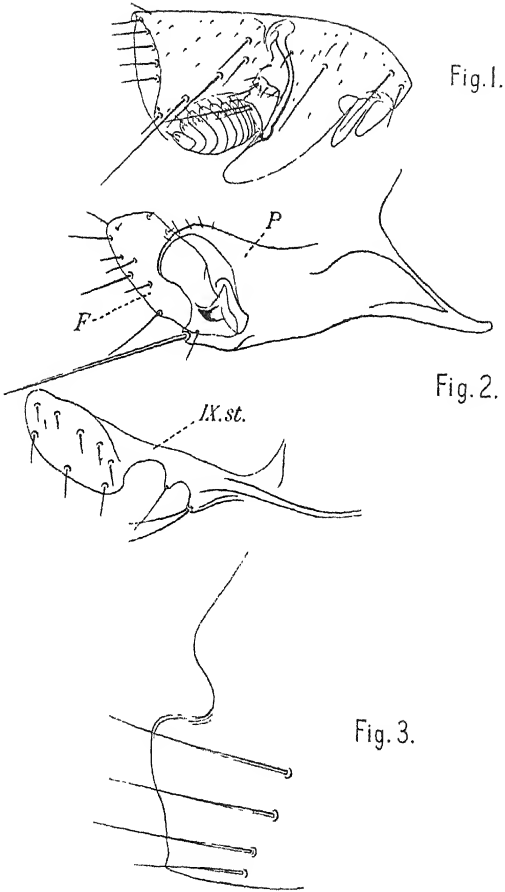
Mr. Nicholson's genial manner and his knowledge of things in general, besides his special knowledge of botany, made his conversation delightful, and the writer will never forget the charming afternoon walks in the beautiful gardens at Kew in his company, and the delight he always expressed when any additions to the fauna or flora were discovered.

A. S.



MALACOSOMA NEUSTRIA, Alb

(To illustrate the Hon. N. Charles Rothschild's note on p. 257,
and to replace the illustration there printed.)



K J del

West, Newman proc.

A NEW BAT-FLEA (NYCTERIDOPSYLLA LONGICEPS, sp. n.)

THE ENTOMOLOGIST

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DECEMBER, 1908.

[No. 547

A NEW SPECIES OF BAT-FLEA FROM GREAT BRITAIN.

BY THE HON. N. CHARLES ROTHSCHILD, F.E.S.

(PLATE VIII.)

Nycteridopsylla longiceps, spec. nov.

THERE are two five-combed bat-fleas in Great Britain, the one being apparently identical with Kolenati's *pentactenus*, while the other is new to science. This new species can easily be distinguished by the following characters:—

Head.—The head is very long and narrow, the frontal portion being about as long as the occipital portion (Pl. VIII. fig. 1). The two bristles placed on the sides of the frontal portion are consequently farther apart than in *pentactenus*.

Thorax.—The epimerum of the metathorax bears four or five bristles (1 or 2, 2, 1).

Abdomen.—The comb of the seventh tergite contains seventeen or eighteen bristles. The seventh sternite is sinuate in the female, but the lobe above the sinus is much shorter than the one below the sinus (Pl. VIII. fig. 2), while in *pentactenus* the upper lobe projects as far as the lower one.

Legs.—The hind femur bears posteriorly near the apex but one ventral bristle on each side. The bristles of the tibiae are distinctly longer than in *pentactenus*, the longest apical one of the mid-tibia reaching almost to the apex of the first tarsal segment.

Modified Segments.—♂. The eighth tergite bears at the dorsal edge five long bristles, and close to this row one or two smaller lateral ones, there being also one or two lateral bristles behind, and some distance from, the stigma. The eighth sternite, which is sinuate ventrally in the centre, bears on each side an apical row of five long bristles, proximally to which there are five or six shorter bristles. The process (P) of the clasper is broad, being rounded on the proximal

side and incurved on the distal side (Pl. VIII. fig. 2). The movable process (F) is very slightly rounded on both sides, and obliquely truncate at the apex, as shown in the figure. There are four long bristles on this process besides a number of small ones, three long bristles being placed on the apical third, while the fourth is placed half-way between the most ventral one of these and the long bristle of the clasper. The bristles near the apex of the finger are not quite constant in length. The ninth sternite of each side consists, as in the allied species, of a proximal and a distal portion separated from each other by a large sinus. At the proximal corner of this sinus, up to which point the right and left halves of the segment are fused, there are two long bristles, one on each side. A short distance beyond this angle there is a short conical process which projects downwards, and bears a thin bristle at the apex. The distal portion of the ninth sternite is broad with an obtuse apex, the ventral and dorsal edges being slightly rounded with the apex feebly curved upwards (Pl. VIII. fig. 3). There are on this portion of the segment three bristles along the ventral edge and five near the dorsal edge.

♀. The eighth tergite has one or two bristles above the stigma, three below it, and four or five ventrally on the lateral surface, there being nine to eleven along the apical edge, of which three or four are longer than the other apical bristles. The stylet is very slender, being four times as long as it is broad at its base.

We have a series of both sexes of this interesting species taken from *Plecotus auritus* and *Scotophilus pipistrellus* at Henley-on-Thames, Tring, Wells (Somerset), Harrow, Welwyn, and Tonbridge.

PAPILIO CAMILLA, LINNÆUS (1764).

By T. H. BRIGGS, M.A., F.E.S.

ALTHOUGH it is now thirty-six years since Mr. Kirby, in 'The Zoologist' for 1872, p. 2952, stated that the *camilla* of Linnæus was the butterfly found in this country, and not the continental species now so named, his statements seem never to have been recognized or adopted since that time, except by Mr. South in his 'The Butterflies of the British Isles,' published in 1906.

The first mention of "*camilla*" was by Linnæus in his Mus. Ludov. Ulr. No. 122, p. 304 (1764), of which the following is the whole description there given. I must preface this by observing that all the descriptions in this work have a short "definition" at the commencement, and then a detailed description at a much greater length than those in any of the different editions of his 'Systema Naturæ' or his 'Fauna Suecica,' and that just previously to this description of "*camilla*" is that of *prorsa*, of which I only need give the short definition at the commencement, as the long one which follows is not material to this paper :—

"Prorsa, Papilio.

"Mus. Ludov. Ulr. No. 121, p. 303 (1764).

"*Alis dentatis concoloribus fuscis fascia alba, subtus lutescentibus. Habitat in Germania*"; and a note at the end: "*Obs. hæc descriptio facta est ad Papilionem. Rœs. 3, t. 70, figs. 1, 2, 3, quam credit meram varietatem Camillæ; Rœselii vero pag. 1, 8, figs. 6, 7, alia omnino ab. hæc proposita est species.*"

DESCRIPTION OF *Camilla*.*"Camilla, Papilio.*

"Ludov. Mus. Ulr. No. 122, p. 304 (1764).

"*Alis dentatis fuscis subcoloribus alba fasciatis maculatisque; angulo ani rubro. Habitat in Lonicera cærulea Germaniæ.*"

This is the short "definition"; the long description is as follows:—

"*Alæ supra omnes nigricantes.*

"*Primores. Fascia arcuata, alba, in medio interrupta in maculas, quarum mediæ minores. Puncta aliquot, alba, versus apicem.*

"*Posticæ. Fascia cuneiformi alba solum nervis dissecta. Macula ad angulum ani rubra cum Punctis duobus nigris majusculis.*

"*Subtus omnes flavescentes. Fascia cærulescenti-albida, extra quam puncta angulata duplici serie.*

"*Differt imprimis a præcedenti macula rubra alarum posticarum ad angulum ani, quam in quibusdam deesse observavit Rœselius.*"

I think that the description here given—"fascia arcuata" on the fore wings, "fascia cuneiformi alba solum nervis dissecta, macula ad angulum ani rubra cum Punctis duobus nigris majusculis" on the hind wings, and the ground colour of the under side, "flavescentes," would convince anyone that the insect Linnæus was here describing as "*camilla*" was our insect, and not the continental allied species, which, so far as I know, has never yet been observed in this country.

There is no reference here to the blue-black colour of the upper surface of all the wings, the row of dark marginal spots on each wing, the white discoidal spot on the fore wings, where the other white spots do not form a fascia; and on the under side the nearly straight, not wedge-shaped, white fascia, and the much darker almost coffee-coloured ground colour of the continental species, which are some of the differences in the markings of the two insects which serve to distinguish them.

In 'The Zoologist' for 1872, p. 2952, Mr. Kirby states:—

"*Limenitis camilla*, L.—In 1764 Linnæus described the sexes of our English 'White Admiral,' calling the male *prorsa* and the female *camilla*. But as he had previously described another species under the name "*prorsa*," he properly changed the name of his second species into *sibilla* in 1767. This, therefore, establishes the name of our species to be correctly *camilla*, L."

The description of *sibilla*, Linn., Syst. Nat. xii. No. 186, p. 781 (1768), is identical with that of the first paragraph of "*prorsa*" in the Mus. Ludov. Ulr., with the addition of "Mus. Ludov. Ulr. 303, sub *prorsa*. Habitat in Germania, similis *camillæ*." That of *camilla*, No. 187, in the same work is also identical with that of the first paragraph of the description of *camilla* in the Mus. Ludov. Ulr., with the addition of "Mus. Ludov. Ulr. 304. Habitat in *Lonicera cærulea* Europe." So *camilla* seemed to have had a more extended range than *sibilla*.

The description of the first *prorsa* (Linn. Syst. Nat. x. No. 134, p. 480 (1758) (which was the cause of his changing the name of the "*prorsa*" of 1764 to *sibilla*) is—

"*Prorsa*.

"*Alis dentatis subfuscis: fascia utrinque alba: primoribus interrupta. Roes. Ins. i. pag. 1 to 8, f. 6, 7. Habitat in Urtica Germaniæ.*"

A very different description from that of the *prorsa* of Mus. Ludov. Ulr., and a different food-plant.

Mr. Kirby also states his reasons more fully in his 'Hand-book of the Order Lepidoptera,' vol. i. pp. 142-6 (1894), where he also gives a reference to Aurivillius, Recens. Crit. Lep. Mus. Ulr. pp. 101-2 (1882), and, as this work is perhaps not very generally known, I will give the extract in full:—

"*Nymphalis camilla* (L.).

"*Dubium esse non potest quin sic hæc species P. camilla, L. et eo nomine appellari debeat. Fuit enim P. Prorsa editionis decimæ systematis alia species, et est ergo Camilla nomen vetustissimum, quod huic formæ conservari potest, qua sententia etiam auctores nonnulli et ii celeberrimi jam antea fuerunt.*"

It has been agreed that the *prorsa* and *camilla* of the Mus. Ludov. Ulr. and the *sibilla* and *camilla* of Linn. Syst. Nat. xii. are sexes of the same insect, but from Linnæus's descriptions alone one would be inclined to consider them separate species, or else he would not have given them distinct names. There does not seem to have been any uniformity, when in the case of an author describing an insect under two names but separately numbered in the same work, which are afterwards found to be sexes of the same insect, whether the name given to the male or

female should be preferred; but the recent usage seems to be that the name which has the prior number in the work should be applied to *both sexes*, although both names were published at the same time. For instance, "*Jurtina*" ♀ (Linn. Syst. Nat. x. No. 104, p. 475 (1758)), has superseded *janira* ♂, No. 106, in the same work, and "*Sannio*" ♂ (Linn. Syst. Nat. x. No. 48, p. 506) has given place to *russula* ♀, No. 78, p. 510, in the same work. So the name chosen does not depend upon sex.

In this country all the old authors called our insect "*camilla*" —Harris (1766), Lewin (1795), Donovan (1798), Haworth (1803), Curtis (1824), Stephens (1828), Wood (1833), and Westwood (1841)—and the first record I can find of the name "*sibilla*" being applied to our insect in this country is in Doubleday's first Synonymic List in 1850.

As Linnæus, in 1768, referred "*camilla*" to the insect of that name in his previous work of 1764, the name *sibilla* ought, therefore, to be abandoned, and that of *camilla* given to both sexes of our insect, and the continental species, as Mr. Kirby has already stated, will take the name of "*drusilla*," Bergsträsser, Nomencl. iii. pl. 69, figs. 5, 6 (1779), as it is impossible to have two closely allied species under the same name in the same genus.

Lymnouth.

DESCRIPTION OF A NEW SPECIES OF CERATINA FROM BORNEO.

By P. CAMERON.

Ceratina cosmiocephala, sp. nov.

Fulvous; the vertex, laterally extending to the end of the top of the eyes, obliquely widened below; the occiput, the front broadly, a broad line running down from each antenna to opposite the end of the eyes, where it turns outwardly along a furrow, a line on the sides of the base of the mesonotum, broadening outwardly, a transverse one on the apex, an irregular broad line on the sides of the apex of the second abdominal segment, a regular one, not occupying quite the half of the base of the third, a broader one on the fourth and the fifth except for an irregular longitudinal mark in the middle, black; the following spots are bright lemon-yellow: two oval spots in the centre of the front, a transverse spot below the antenna, rounded and narrowed above, the sides also rounded but not narrowed, below it is a large mark, wide but narrowed below, its top bluntly rounded, its apex prolonged laterally, but not so widely, to near the eyes, a line along the inner orbits gradually widened from the top to the bottom, and with an irregular inner edge, the labrum except for a fuscous spot on either side near the top, the basal, widened half of the mandibles, almost the inner half of the outer orbits, almost the whole of the prothorax, a line along the outer edge of the mesonotum, two narrower lines in the centre, on the apical two-thirds, scutellums,

tubercles, an irregular mark dilated on the top, at the apex, down the basal half of the mesopleuræ, and the metanotum broadly laterally. Legs coloured like the body, but with the four anterior femora and tibiæ largely yellow, and the hinder tibiæ blackish behind. Wings hyaline, the costa and stigma dark, the nervures of a lighter fuscous colour. Antennæ black, the flagellum fuscous, the scape lined with yellow below. ♀. Length, 7 mm.

Kuching, Borneo (John Hewitt, B.A.).

Smooth, shining, the labrum strongly, the mesopleuræ less strongly punctured; the apical abdominal segments roughened. Except on the apical abdominal segments, on which it is shorter, closer, and black, the pubescence is white.

NOTES ON BRITISH BRACONIDÆ.—VII.

By CLAUDE MORLEY, F.E.S., &c.

EUPHORIDÆ.

As I stated in my last paper (Entom. 1908, p. 125), this family is distinguished from the Meteoridæ, there treated of, solely by its lack of a dividing nervure between the second and third cubital cells; but, in my opinion, this is but a poor character, since all the subcubital cells are often obsolete or entirely wanting in many of the smaller and more weakly developed species of the present family; and, in the genus *Perilitus*, we get the first cubital and discoidal cells confluent, as well as a partially wanting radial nervure, which indicate how inconclusive must be characters drawn from pellucid or interstitial neurulation in this group. A very few species of the Euphoridæ are extremely abundant with us in the spring, but the great majority are of rare occurrence, and I have met with but a very limited number during the past fifteen years, a neglect for which the small size of so many is doubtless responsible. Most, probably all, of them are coleopterous parasites, two have been bred from *Orchesia minor*, Walk., and species of *Timarcha*; and there is a great field open here for the Coleopterist, who takes the trouble to breed his Phytophaga, to prove their association with these pretty little Braconids.

We have all the European genera but the curious *Cosmophorus*, Ratz. :—

- | | | |
|-----|--|---------------|
| (4) | 1. Antennæ curiously modified. | |
| (3) | 2. First cubital cell discreted from first discoidal | EUSTALOCERUS. |
| (2) | 3. First cubital cell confluent with first discoidal | STREBLOCERA. |
| (1) | 4. Antennæ normal. | |

- (6) 5. Basal segment longer than all the following; head broad *WESMAELIA*.
 (5) 6. Basal segment not longer than following together; head of normal breadth.
 (10) 7. Radial cell very short, strongly arcuate apically.
 (9) 8. Metathorax neither vertically truncate nor apically excavate *EUPHORUS*.
 (8) 9. Metathorax vertically truncate and apically excavate *PERILITUS*.
 (7) 10. Radial cell longer, narrower, reaching nearer apex of wing *MICROCTONUS*.

The first three genera are very rare; of the single species, *clavicornis*, Wesm., of the first, only two specimens (from Belgium and England) are known. *Streblocera* possesses two, *S. fulviceps*, Westw., and *S. macroscapa*, Ruthe, which is distinguished from the former by the female having the antennæ once elbowed, and the male not at all, in place of twice in both sexes; some three examples of the first and five of the second are known. *Wesmaelia cremasta*, Marsh., has been found only at Bielsa in the Pyrenees, in Devonshire, and Germany; but several American species are known.

EUPHORUS, Nees.

- (2) 1. Basal abdominal segment hardly longer than broad *mitis*, Hal.
 (1) 2. Basal abdominal segment fully thrice longer than broad.
 (14) 3. Notauli punctate and entire.
 (5) 4. Antennæ 16-jointed; male unknown *similis*, Curt.
 (4) 5. Antennæ of female more than 16-jointed (except rarely in *E. picipes*).
 (11) 6. Mesonotum punctate.
 (8) 7. Antennæ of female 16- to 18-jointed, of male 19- to 21-jointed *picipes*, Hal.
 (7) 8. Antennæ more than 18-jointed, of male 23- to 27-jointed.
 (10) 9. Spiracular tubercles of basal segment indistinct *pallidipes*, Curt.
 (9) 10. Spiracular tubercles of basal segment prominent *tuberculifer*, Msh.
 (6) 11. Mesonotum glabrous.
 (13) 12. Basal abscissa of radius short and punctiform *coactus*, Marsh.
 (12) 13. Basal abscissa of radius wanting (*Harkeria*, Cam.*) *accinctus*, Hal.

* Cameron's new genus, *Harkeria* (Ann. Nat. Hist. 1900, p. 537), is certainly not distinct from *Euphorus*, Nees, and the only differential point I can trace is the shape of the alar stigma, which is said to be linear, elongate, and narrow; whereas in the latter it is large and triangular. But the

- (3) 14. Notauli smooth and not entire.
 (16) 15. Notauli not entirely wanting, distinct in front *intactus*, Hal.
 (15) 16. Notauli entirely wanting.
 (20) 17. Body testaceous, anus infuscate.
 (19) 18. Wings clouded; basal segment linear . . . *apicalis*, Curt.
 (18) 19. Wings hyaline; basal segment distinctly dilated apically *ornatus*, Marsh.
 (17) 20. Body piceous or black.
 (22) 21. Antennæ of female filiform, and longer than head and thorax *parvulus*, Rutho.
 (21) 22. Antennæ of female incrassate apically, and much shorter *fulvipes*, Curt.

E. picipes.—A common species from May 14th to June 12th only. I have a single very small male, taken on the sand-hills at Kilmore, in Ireland, on August 14th, 1898, by the late Alfred Beaumont; but I fancy this must belong to some distinct and undescribed species. Females are the commoner sex, and may frequently be beaten from bushes and swept from herbage in woods; but no host has yet been suggested for it. I have taken it at Haven Street and Norton Woods, in the Isle of Wight, at Gosfield, in Essex, and at Tuddenham Fen, Stanstead, and Barnby Broad, in Suffolk, as well as in Matley Bog, in the New Forest.

E. pallidipes.—An abundant species from May 10th to July 3rd, and usually taken by sweeping low herbage; it is said by Curtis (B. E. fol. 476) to have been once bred in England from the pupa of *Orchesia*, a common heteromorous beetle living in Boleti. Piffard has found it at Felden, in Herts; I have seen it at Calbourne, in the Isle of Wight, Brockdish, in Norfolk, Belstead, Stanstead, Barton Mills, Bentley, Brandon, Foxhall, and Henstead, in Suffolk. Its variety, with the head mainly red, is rarer, though not uncommon in marshes in the same county at Tuddenham, Reydon, and Brandon from the middle of June to July 2nd; and Wilson Saunders took it at Greenings, in Surrey, in June, 1871. The second variety, with the body also mainly red, has not hitherto been noted in Britain; but I possess an example, captured recently at Felden, in Herts, by Mr. Albert Piffard, F.E.S.

E. intactus.—I have a single female, which I believe referable

especial point, upon which his genus is founded, is the basally wanting radial nervure, and this is described exactly as it was by Haliday in the case of his *E. (Leiothron) accinctus*, male, in the old 'Entomological Magazine' of 1835, p. 465: "Stigmatē . . . areolam cubitalem secundam contingente." I am strongly inclined to regard *Harkeria rufa* (loc. cit., p. 538), from Gloucester, as the hitherto unknown female of *Euphorus accinctus*, Hal., which no one has taken for seventy years, and for which no locality more exact than England or Ireland has yet been given.

to this species; it was beaten from an old oak in the Wilverley Inclosure, in the New Forest, June 14th, 1907.

E. apicalis.—Two females of this beautiful species (figured by Curtis, B. E., pl. 476) were beaten from oak on July 2nd, 1904, and the same date in 1906 in Cutlers Wood, Freston, and an alder carr at Reydon, both in Suffolk.

PERILITUS, Nees.

- (10) 1. First cubital and discoidal cells not separated by a nervure.
- (9) 2. Radial nervure apically strongly arcuate.
- (8) 3. Abdomen entirely or apically black.
- (7) 4. Stigma infusate or nigrescent.
- (6) 5. Metanotum with distinct areæ. *cerealium*, Hal.
- (5) 6. Metanotum rugulose throughout, with no areæ *athlops*, Nees.
- (4) 7. Stigma pale testaceous *bicolor*, Wesm.
- (3) 8. Abdomen mainly or, at least, apically testaceous *secalis*, Hal.
- (2) 9. Radial nervure apically hardly arcuate *brevicollis*, Hal.
- (1) 10. First cubital and discoidal cells separated by a nervure.
- (12) 11. Radial nervure ending exactly half-way between stigma and apex *falciger*, Ruthe.
- (11) 12. Radial nervure ending much nearer apex of wing than that of stigma.
- (14) 13. Hind femora and tibiæ testaceous throughout *rutilus*, Nees.
- (13) 14. Hind femora or tibiæ more or less nigrescent *strenuus*, Marsh.

P. athlops.—This is said to be a common species, but I possess only a single male, swept from a hedge-bottom at Lakenheath, Suffolk, July 13th, 1899.

P. bicolor.—Beaumont has given me several females of this species, which he found commonly on the sand-hills at Kilmore, in Ireland, on August 10th and 23rd, 1898.

P. secalis.—I possess a female captured at Felden, Herts, by Piffard.

P. rutilus.—Also taken at Felden by Mr. Piffard. Several females occurred to me by sweeping beans in a field at Wicken, Cambs., June 7th, 1902. I swept a male at Ipswich on July 3rd, 1895; and took a female on my study window at Monk Soham as late as October 10th, 1906. It is doubtless an abundant species, and I suspect it of preying upon species of *Sitones*.

P. strenuus.—The only male I have seen was captured on a flower of *Feniculum vulgare* on the coast at Alderton, in Suffolk, September 3rd, 1899.

MICROCTONUS, Wesm.

- (6) 1. Metanotum finely carinate centrally.
- (3) 2. Median nervure of anterior wings obsolete *conterminus*, Nees.

- (2) 3. Median nervure of anterior wings always visible.
- (5) 4. Metanotum with five areas *testaceus*, Capron.
- (4) 5. Metanotum with three areas *cultus*, Marsh.
- (1) 6. Metanotum not centrally carinate.
- (8) 7. Basal abdominal segment aciculate; body mainly pale *splendidus*, Marsh.
- (7) 8. Basal abdominal segment glabrous; body, except head, black *xanthocephalus*, Marsh.

M. splendidus.—One female was swept from reeds at Southwold in a salt-marsh, August 1st, 1900. Bignell was sceptical of this determination, but the insect agrees in every particular with Rev. T. A. Marshall's description.

M. xanthocephalus.—Donisthorpe has given me a female which he took in Co. Kerry, June, 1902.

DESCRIPTION OF A NEW GENUS AND SPECIES OF CRYPTINÆ (ICHNEUMONIDÆ) FROM BORNEO.

By P. CAMERON.

PALMERELLA, gen. nov.

Areolet minute, punctiform, the recurrent nervure received at its apex; the transverse median nervure received shortly behind the transverse basal; transverse median nervure in hind wings broken near the bottom; radial cellule elongate; disco-cubital nervure unbroken. Metanotum with one transverse keel, and with a square area in the middle of the base, behind the keel; the sides at the apex armed with long spines; the spiracles ovate, of moderate size. Abdominal petiole rather stout, broad, curved, longer than the second segment. The third antennal joint not much longer than the fourth. Hind legs very long. Palpi long, the maxillary reaching to the middle coxæ. Scutellum roundly, broadly conical; the apex has a long, steep slope. Eyes large, parallel. Thorax fully three times longer than wide; the head is wider than it; its front is depressed and is keeled down the middle; there is a complete metapleural keel. The parapsidal furrows extend from the base to the apex of the mesonotum.

The type of this genus differs from the other *Mesostenini* (the group to which it belongs) in having the body and legs black: the scutellum is much more prominent than it is with *Mesostenoides* or *Buodias*, and, more particularly, in being steeply declivous behind; the hind legs are longer and more slender, and the abdomen shorter and narrower, its petiole stouter and of more equal width, as well as being longer compared with the second segment. Looked at from the sides the base of the metanotum is seen to be depressed, the post-scutellum appearing behind the depression as a small tubercle.

The type of the genus has hardly the appearance of a

Cryptid ; it looks, in fact, like one of the *Acœnitini*. I unfortunately only know the male.

Palmerella nigra, sp. nov.

Black; a small squarish white spot immediately below the antennæ and the palpi white, the fore legs brownish testaceous in front; wings clear hyaline, the nervures and stigma black. ♂. Length, 8 mm.

Kuching, Borneo (John Hewitt, B.A.).

Face and clypeus closely, rugosely punctured, the former almost reticulated; the front and vertex more closely and finely reticulated-punctured. Flagellum of antennæ fuscous, black above. Thorax, except the lower part of the propleuræ, closely, distinctly punctured; the scutellum more strongly than the mesonotum, the metanotum still more strongly and more clearly reticulated; the depression on the propleuræ striated below the middle. First abdominal segment distinctly but not closely punctured; the second closely and regularly punctured; the punctuation on the others becomes gradually weaker. Legs shortly, thickly haired; the coxæ and femora rather strongly, closely punctured; the long spur of the hind tibiæ reaches to the middle of the metatarsus; the apex of the third joint of the hind tarsi and the fourth yellowish white.

COLIAS EDUSA BRED IN OCTOBER, 1908.

By F. W. FROHAWK, M.B.O.U., F.E.S.

It may interest some of the readers of this Journal to know I have succeeded in rearing a nice series of *C. edusa* this autumn from a female captured August 7th at Wallasea, Essex (recorded in the September issue, p. 229). I find, on going over the set specimens, which number sixty, just thirty are males and thirty females. A few others of both sexes emerged, which I did not set; therefore the sexes produced were of about equal proportion. Most of the females resemble the parent in having the marginal spots reduced in both number and size, which are almost absent in some. The central spots on the primaries are larger than usual, and a few have the central blotch of the secondaries exceptionally large, forming in two or three specimens conspicuous variation.

The eggs hatched at the end of August. The parent died August 30th. The first larva spun up for pupation September 21st, and pupated on 23rd, followed by others daily. The first imago (a male) emerged October 8th, followed by others of both sexes daily during the following fortnight.

All the specimens (excepting two or three not set) are of full average size, owing to the fine warm weather during the feeding up of the larvæ and the emergence of the butterflies; usually late autumnal specimens are reduced in size by cold weather.

NEW AMERICAN BEES.—VII.

By T. D. A. COCKERELL.

OLIGOTROPUS, Robertson.

ROBERTSON (Trans. Am. Ent. Soc. xxix.) has segregated from *Megachile*, under the name *Oligotropus*, a species which he names *O. campanulæ*, but which is evidently the same as that formerly reported as *Megachile exilis*. I possess a specimen of this from Robertson, but I have not seen the true *M. exilis*, Cresson, described from Texas. The group is a distinct one, and possibly deserves generic rank; in addition to the characters reported by Robertson, it has some peculiarities of the galea and maxillary palpi, as indicated in Ann. & Mag. Nat. Hist., March, 1902, p. 232. Upon comparing the available materials, I am able to discriminate several closely allied species or races, occupying different regions. These may be separated as follows:—

Anterior tarsi of male pale ferruginous (Humid lower
austral zone of Texas) *Megachile exilis*, Cresson.

Anterior tarsi black or brownish black 1.

1. The two middle nodules on lower edge of female clypeus much closer together than the distance from either to the lateral nodule; female about 10 mm. long; abdominal bands in both sexes very narrow, but distinct, and pure white (Boulder, Colorado, July 24th to Aug. 4th, 1908, S. H. Rohwer)

Megachile subexilis, n. sp. or subsp.

The nodules nearly equally spaced, but the interval between the lateral and median ones large; insect a little larger and more robust than the last, with the abdominal bands very distinct, and yellowish (West Fork of Gila River, New Mexico, July 16th, C. H. T. Townsend; Rio Ruidoso, New Mexico, on flowers of *Vicia* aff. *pulchella*, alt. 6700 ft., July 27th, male, C. H. T. Townsend)

Megachile semixilis, n. sp. or subsp.

The small lateral nodules very close to the median ones; abdominal bands only moderately distinct 2.

2. Last ventral segment of female with black hair; lower margin of clypeus strongly arched or concave (Southern California)

Megachile angularum, Ckll.

Last ventral segment of female with light hair; lower margin of clypeus scarcely arched (Southern Illinois, Robertson; Indiana, from Lovell)

Megachile campanulæ (Rob.).

M. semixilis is the species of New Mexico hitherto recorded as *exilis*; the mouth-characters recorded in Ann. Mag. Nat. Hist. (as cited above) under *exilis* were derived from *semixilis*. I have a series of each of the Rocky Mountain forms, and there

is no doubt that they are distinct. In the male it is hard to distinguish *campanulæ* from *subexilis*, but *campanulæ* has the wings evidently darker. The male of *M. angelarum* is not known. The Gila River is the type locality for *M. semixilis*.

Colletes myroni, n. sp.

♀. Length, 9 mm. or a little over, rather robust; *thorax above with bright orange-fulvous hair (with no black)*; *hair of head entirely, and of pleura, black*; that of sides of metathorax thin and pale yellowish; hair of legs black, except on inner side of tarsi, where it is orange-fulvous; abdomen oval, rather small, very shiny, with scattered extremely minute punctures (close at extreme base of second segment); first segment with long pale yellowish hair (some black at extreme sides); remaining segments with rather inconspicuous black hair, but second with some scattered pale yellowish hair on disc, and a feeble apical band of short whitish hair. Clypeus densely, coarsely, more or less confluent punctured; labrum shining, with a central pit, the edges of which are raised; antennæ entirely dark; facial depressions large and broad; vertex shining; mesothorax shining, with distinct, rather close punctures; no visible prothoracic spines; tegulæ shining black; base of metathorax with the pits irregular, more or less transversely ridged, and less distinctly bounded behind than is usual; wings dusky, with piceous nervures; first r. n. joining second s. m. before its middle; second r. n. with a strong double curve; hind spurs simple. Malar space short, more than twice as broad as long. A remarkable species, looking like some forms of *Andrena*, as *A. berberidis*. The shining black abdomen suggests *C. nigrifrons*, Titus, but that species is narrower, has quite differently coloured hair on thorax above, and small narrow facial depressions. I do not know of any species which can be said to be closely allied.

Hab. Boulder, Colorado, May 26th, 1908 (S. A. Rohwer). Named after Mr. Myron H. Swenk, in recognition of his very valuable work on the genus *Colletes*.

Panurginus didirupa, n. sp.

♂. Length about 7 mm.; in the table in Ent. News, 1907, p. 184, runs to *P. ornatipes*, to which it is very closely allied. It differs from *P. ornatipes* by the longer antennæ, the entirely black scape, the supraclypeal mark (which is almost exactly square) extending half its area above the general level of the lemon-yellow of the face, and the hind tibiæ black except at extreme apex. Clypeus very strongly punctured, without any median groove (in *P. boylei* there is a very distinct groove); flagellum entirely black; dog-ear marks small, cuneiform; front densely punctured; mesothorax shining; wings strongly dusky; second and third abdominal segments broadly depressed basally, this area covered with fine silky brownish-grey hair; hind tarsi with first two joints yellow, the others brown.

♀. Almost exactly like *P. ornatipes*, but the shining apical depressions of the abdominal segments are minutely granular (smooth in *ornatipes*), and the area of the metathorax is better defined. Wings

strongly smoky; nervures and stigma dark fuscous; mesothorax very shiny, with sparse but strong punctures; hind tarsi black.

Hab. North Boulder Creek, Boulder County, Colorado, in the Canadian Zone (S. H. Rohwer, 1907). The type is a male, Aug. 21st. The female was taken Aug. 22nd. The specific name refers to the yellow face of the male, in the language of Celebes.

At Livermore, Colorado, Aug. 12th, 1908, Mr. Rohwer took *Perdita lacteipennis*, Swenk & Ckll, and *Panurginus piercei*, Crawf., at flowers of *Helianthus*. These species are new to Colorado.

University of Colorado, Boulder, Colorado :
October 25th, 1908.

NOTES FROM SOUTH-WESTERN FRANCE.

By W. G. SHELDON, F.E.S.

RETURNING from Andalusia last spring, I stopped at Guéthary, near Biarritz, from 23rd to the 29th of May. Guéthary is at all times a very charming spot for a short sojourn, and in July and August on a previous occasion, when passing through, *en route* for Spain, quite a number of interesting Diurni were observed. On this occasion, however, I cannot report that the butterflies seen were either numerous in species or examples, and those that did occur were few of them of special interest. Amongst them, on most days, I came across several specimens of *Everes argiades* in good condition; these were presumably a first brood, and the brood I observed in the middle of July, 1905, just going off, and a brood coming on during the second week in August the same year, would, no doubt, represent the second and third broods. Assuming that there would be another brood in September, it seems probable that in this district *E. argiades* gets in at least four broods each summer. A few *Melitæa cinxia* were observed in one small locality; and on a marsh, *M. aurinia* of the typical Central European form were abundant. I observed a single example of *Papilio podalirius*, but failed to effect its capture. *Brenthis selene* was not infrequent, and was generally distributed; I had on my previous visit taken the second brood of this species in August. A worn *Colias edusa* var. *helice* afforded me a few ova, from which, on my return home, I bred seven examples—two typical males and females, and three var. *helice*. An interesting capture was four examples of undoubted *Melitæa parthenie*. Other species observed were: *Cænonympha pamphilus*, *Pieris brassicæ*, *P. rapæ*, *Cyaniris argiolus*, *Pararge egeria* (typical), *Nisoniades tages*, *Hesperia malvæ*, *Pyrameis cardui*, *Brenthis dia*, *Gonepteryx rhamni*, *Polyommatus baton*, *P. alexis*, *Melitæa*

phæbe, *Euvanessa antiopa*, *Leucophasia sinapis*, *Pyrameis atalanta*, *Limenitis camilla*, *Euchloë cardamines*, and *Epinephele ianira*. Larvæ of *Euvanessa antiopa* and *Eugonia polychloros* were exceedingly abundant on the willows, and I brought away a batch of ova of the former species, from which a fine series of imagos was reared in August; a large number of these I turned out in the garden here.

Youghal, South Croydon: Oct. 30th, 1908.

DESCRIPTION OF A NEW GENUS AND SPECIES OF BRACONIDÆ FROM BORNEO.

By P. CAMERON.

Pachybracon, gen. nov.

Eyes large, pubescent; there is a distinct malar space; temples wide, obliquely narrowed; the occiput transverse, not margined. Palpi long, stout, the maxillary six-jointed. Four front legs normal, the hinder long, thickened, densely haired, especially the tibiæ, on which the hair is long, dense, thick, as it is also on the metatarsus. Calcaria moderately long; the claws small, simple. Otherwise as in *Bracon*. The antennæ are placed on the top of the head; the mesonotum is trilobate; the abdomen is broader than the thorax and is ovate; the basal segment is broad at the base; the apex is as broad as the length; there is no keel on the second segment; there is a long ovipositor; the basal joint of the hinder tarsi is shorter than the others united; the third and fourth are smaller than the second or fifth. The antennæ are longer than the body, are stout, and of equal width. There is a distinct, crenulated, suturiform articulation.

This genus may be described as a *Bracon* with hairy eyes, and with the hind legs greatly thickened and densely covered with long stiff hair. No species of Braconinæ with pubescent eyes has hitherto been described, although hairy eyes are known with some of the other groups, *e. g.* with *Chelonus*.

Pachybracon fortipes, sp. nov.

Black; the basal two-thirds of the antennal flagellum rufo-testaceous; the wings blackish to the base of the stigma (including the first cubital cellule), milky hyaline beyond; the hind wings blackish to near the apex; the stigma, except in front, the radius, and the cubitus from the first transverse cubital nervure are pale yellow, almost white; the recurrent nervure is almost interstitial. Head and thorax smooth and shining, sparsely covered with short black hair, the pubescence on the face paler, on the palpi white. Abdomen opaque, closely, rugosely punctured, the apical two segments smooth and shining. The apical abscissa of the radius is as long as the basal two united. Length, 7 mm.; terebra, 2 mm. ♀.

Kuching, Borneo (John Hewitt, B.A.).

The radius issues from the basal third of the stigma. The sculpture is stronger on the second abdominal segment than on the others; it runs on it into reticulations.

The coloration of this species seems to be common in Borneo; it is found in *Iphiaulax*, *Cremnops*, and *Disophrys*.

THE BASSES-ALPES IN AUGUST.

By H. ROWLAND-BROWN, M.A., F.E.S.

(Concluded from p. 262.)

THIS aberration appears in every respect to correspond with ab. female *midas*, Lowe, which occurs also on the high cliffs of Vernayaz in the Rhone Valley.

A morning in the gully that leads up to the high rocks overlooking the Dourbes road may generally be counted well spent. This year, however, much of the shrubbery and undergrowth has been cut down, and in August also the *garrigues*—the successive steps of long deserted vineyards, in which the wild flowers run riot—are more or less burnt up. A large white scabious proves the most attractive bait for such butterflies as are about—worn examples of a third (?) brood of *A. dia*, *S. actæa*, in all stages of dilapidation, fresh *P. daphidice*, and some monster *P. podalirius* ab. *feisthamelii*, while not a few semi-transparent *Z. ephialtes* var. *coronilla* testify to earlier abundance. On the summit there is the usual concourse of Papilionidæ, but not much else; the *P. machaon* of normal size, and in colour for all the world as though they had just been introduced from the Cambridgeshire Fens!

Meanwhile, I had not forgotten the quest for *E. scipio*, and on the 18th left Digne at half-past five upon the tramp which was before me. But the north precipices of the long range of cliffs that seem to shut in the valley so completely are out of the sun until close upon noon, and though it is not easy to find the one point of approach when actually past Villars, the kindly offices of a farmer assisted me through the fir plantations which are rapidly converting the barren hill-sides into useful and agreeable forests, while upon the rough footpath, constructed for the use of the verderers, have sprung up innumerable raspberry-canecanes—now laden with sweet fruit—and plots of scented strawberries. When I finally mounted “the breach,” about eleven o’clock, I was in a state of pleasurable excitement. In the dewy shadows of the forest I had encountered scarcely a butterfly, but the sun was shining full upon the cleft which was surely to be the desired terminus, and now I thought I was likely to be rewarded. The further range of the Dourbes at this point slopes

abruptly away to another valley, bare of trees, the sides well clothed with dwarf conifers and flowering sweet-scented herbs, among which *Erebia* certainly were to be seen. But, after all, it was only *neoridas* again, and the sky suddenly hazing in with a light misty rain—was ever such ill-fortune?—I reluctantly abandoned the ascent of the Cheval Blanc, which would have taken me perhaps a thousand feet higher. Of course I ought to have ascertained beforehand at what altitude and where *scipio* actually occurs. The small *goante* which I presently encountered on the way back under the cliffs momentarily deceived me, for no sooner had I quitted the tops than out came the sun again. But it was now too late in the day to retrace my steps, and as it was I did not get back to Digne much before six o'clock, stopping to gossip with an old friend on the road, and afterwards, just as I was entering the *octroi*, noticing a fine male *Polygona egea* seated on a sun-baked rock. This I secured, and another on the wing, though I am bound to say that I struck at a *G. cleopatra*, without seeing the pursuer, which was landed in my net minus the pursued!

The undercliff of the Dourbes also gave me several fair typical females of *C. virgaurea*, and some magnificent *A. adippe* females. Finally, I spent the 19th in the vineyards and on the hills above the cemetery, where the many plants of *aristolochia* with perforated leaves led me to hope that the professional collectors have not yet succeeded in exterminating the dainty *Thais rumina* var. *medesicaste*, which usually I have found here in the spring of the year, but in ever-decreasing numbers. A few broken *Zephyrus quercus* zigzagged among the dwarf oaks, but *Z. betulæ* was not in its former haunt at the top of the path, where I took the only specimen seen this year of *Lampides bœticus*, a male. Indeed, I failed to turn up *betulæ* at all, even in the Eaux Thermales locality, where Mr. Tutt mentions it as having occurred in profusion last year. The August brood of *P. alexis*, moreover, showed little or no local peculiarity, save in the matter of diminished size, and this was the only really common butterfly still on the wing in this locality. So next day I bade adieu to Digne, and returning home leisurely by degrees, and Dijon—round which charming old Burgundian city there is a most likely looking entomological country—I reached London and the end of the summer holidays in the beginnings of the tempests of the 26th.

Since writing the above I have heard from Mr. H. Powell, of Hyères, who has kindly given me permission to publish the following interesting account of the habitats of *Erebia scipio*, from which it may be gathered that although, in one case at least, I was on the right ground for the species, I arrived, generally speaking, too late in the season. He says:—"Scipio in the

Basses-Alpes appears about the middle of July, but one can still get good specimens at the beginning of August, and I took one fresh female as late as August 31st on the Dormillouse Mountain above Seyne at a height of 2300 metres in 1901. In 1899 I found it on a barren mountain close to Allos—between that village and the Cheval de Bois about July 18th, and also on the rocky slopes on the right-hand side of the Verdon, between Allos and Colmars. On July 19th, 1901, I took some males in the Gorge de St. Pierre, Beauvèzer, on the stony slope on the left-hand side going up, just before reaching the precipitous part, and on July 22nd it was fairly plentiful there. Another Beauvèzer locality for it is on the range to the west and north-west, on the steep stony slopes with a little grass, which run up above the forest limit to the precipices supporting the top of the mountains. Here I took several specimens on August 3rd, some of the females being very fresh still, but the males, although abundant, were mostly worn. In 1906 I met with *scipio* on the eastern slopes of the Lausson, between the Lac d'Allos and Entrevaux. The date was July 30th, but I took more specimens there on August 4th. The ground was very bad; masses of loose rock and stones, and very steep. I think this is the only record of *Erebia scipio* in the Alpes-Maritimes."

The following list includes all butterflies taken or observed in the Basses-Alpes between August 1st and the 20th:—

HESPERIIDÆ.—*Carcharodus althææ*; *Hesperia carthami*; *H. alveus* var. *fritillum*, var. *cirsii*, Rmbr., and var. *conyzæ*, Guénée; *H. malvæ* (Allos); *Pyrgus proto*; *P. sao*; *Nisoniades tages* (Allos); *Pamphila comma*; *Thymelicus actæon*; *T. lincolni*.

LYCENIDÆ.—*Chrysophanus virgaureæ*; *C. hippothoë* var. *eurybia*; *C. alciphron* var. *gordius*; *C. dorilis*; *C. phlæas*, and ab. *eleus*; *Cupido minima* var. *montana*; *Nomiades semiargus*; *Polyommatus damon*; *P. meleager*, and ab. *stevensi*; *P. corydon*; *P. bellurgus*; *P. hylas*; *P. escheri*; *P. alexis*; *P. eros*; *P. orbiculatus* (1); *P. astrarche*; *P. baton*; *P. optilete* (1); *Itusticus argus*, L.; *R. argyrognomon*; *Cyaniris argiolus*; *Lampides beticus* (1); *Zephyrus quercus*; *Thecla spini*; *T. acaciæ*.

PAPILIONIDÆ.—*P. podalirius*; *P. machaon*; *Parnassius apollo*.

PIERIDÆ.—*Aporia cratægi*; *Pieris brassicæ*; *P. rapæ*; *P. napi*; *Pontia callidice* (Allos); *P. daphidice*; *Leptosia sinapis* var. *chinensis*, and ab. *erysimi*; *L. duponcheli*?; *Colias phicomone*; *C. hyalæ*; *C. edusa*; *Gonepteryx rhamni*; *G. cleopatra*.

NYMPHALIDÆ.—*Dryas paphia*; *Argynnis aglaia*; *A. adippe*; *A. niobe* var. *eris*; *Issoria lathonia* (Allos); *Brenthis euphrosyne*; *B. ino*; *B. amathusia*; *B. dia*; *B. pales*, and var. *arsilache*; *Melitæa phœbe*; *M. cinxia*; *M. didyma*; *M. deione*; *M. par-*

thenie, and var. *varia*; *Pyrameis cardui* (Digne); *P. atalanta*; *Aglais urticae*; *Polygonia egea*; *P. c-album*; *Limenitis camilla*; *Pararge mæra*, and var. *adrasta*; *P. megæra*; *Satyrus hermione*; *S. aleyone*; *S. statilius* var. *allionia*; *S. fidia*; *S. actæa*; *S. cordula*; *Enodia dryas*; *Hipparchia briseis*; *H. semele*; *H. arethusa*; *Epinephela jurtina* var. *hispulla* (Digne); *E. lycaon*; *E. tithonus*; *Cænonympha iphis*; *C. arcania*, and ab. *philea* (Allos); *C. dorus*; *C. pamphilus*, and ab. *lyllus*; *Erebia epiphron* var. *cassiope* (ab. *obsoleta*); *E. mnestra*; *E. alecto* var. *glacialis*?; *E. stygne*; *E. euryale*; *E. ligea*; *E. æthiops*; *E. neoridas*; *E. goante*; *E. gorge*; *E. tyndarus* var. *dromus*; *E. lappona* (1); *Melanargia galatea*.

Being representative of one hundred and six species.

DESCRIPTIONS OF A NEW GENUS AND TWO NEW SPECIES OF PARASITIC CYNIPIDÆ FROM BORNEO.

By P. CAMERON.

PARAMBLYNOTUS, gen. nov.

Antennæ stout, thirteen-jointed, the third joint almost as long as the following two united, the last as long as the preceding two united; the intermediate joints more than twice longer than wide. Radial cellule closed on fore margin, more than twice longer than its greatest width; the first cubital cellule closed, the second obsolete, but the nervure is thickened where it ought to be; the cubitus extends to the apex of the wing; the nervures are thickened. Eyes bare, placed on the upper part of the head, the malar space being somewhat longer than them. Cheeks margined. Ocelli prominent. Scutellum large, not much raised over the mesonotum, broadly rounded at the apex. Metanotum irregularly reticulated. Abdomen lenticular, sessile, the second segment is a little longer than the third, which is of about the same length as the fourth, the fifth is as long, dorsally, as the basal segments united; the sixth about one-third of its length. Legs stout, the hind coxæ and femora greatly thickened, the coxæ almost twice the thickness of the femora. Calcaria short, as long as the width of the apex of the tibiæ; the claws long, thin, curved. There are indistinct parapsidal furrows. The temples are short; the occiput is margined and is rounded inwardly. The male has the antennæ as long as the body (in the female it is as long as the head and thorax united) and fourteen-jointed; the third joint is straight, and is distinctly shorter than the fourth; the last is not much longer than the penultimate. The head and thorax are strongly punctured; the punctures on the latter are deep, round. There is a wide crenulated furrow below the middle of the mesopleuræ; the mesosternum is bordered by a ridge, the collar is also bordered by a stout ridge. The hind legs are stouter and their coxæ longer than usual.

The relationship of this genus is with *Amblynotus*, Htg. ; that genus has the antennæ filiform in the female, and in the male they have the third joint incised : the basal two abdominal segments are equal in length ; the thorax is only finely granulated, the thorax is not rugosely punctured, the abdominal petiole is smooth, and there is a distinct areolet.

Paramblynotus punctulatus, sp. nov.

Black ; the mandibles, the four anterior knees, the tibiae except behind, and the tarsi testaceous, the wings hyaline, the first cubital and the radial cellule clouded, the nervures black ; the face, cheeks, and the mesopleuræ behind covered with white pubescence ; there is a patch of depressed white pubescence on the base of the mesopleuræ above ; the apical segments of the abdomen are fringed with long white hair ; legs densely covered with white pubescence ; face closely, rugosely punctured, the front and vertex are more strongly punctured ; the punctures deep and sharply margined. Except on the mesopleuræ the thorax is strongly, deeply, thimble-mark-like punctured ; the mesopleuræ smooth and shining, except behind ; there are a few irregular punctures on the apex. Metapleuræ densely covered with white pubescence, rugosely punctured, and with an oblique squarish area in the centre of the base. The eyes are surrounded by a crenulated border. Antennal scape shining, the flagellum bare, opaque. ♀. Length, 5 mm.

Kuching, Borneo (John Hewitt, B.A.). A stoutly built species.

The foveæ at the base of the scutellum are large, square, smooth, shining, roundly depressed and separated by a narrow but distinct keel. The basal abscissa of the radius is straight, oblique, about one-third of the length of the apical and distinctly thicker than it. The apical slope of the metanotum is smooth above and below, and with two rows of large foveæ in the middle.

Paramblynotus ruficeps, sp. nov.

Black ; the head and pronotum red, the tegulæ of a darker red ; the tarsi and the four anterior tibiae rufo-testaceous, the posterior tarsi darker than the others ; antennæ as long as the body, the scape rufous, the flagellum black ; wings hyaline, the nervures black, the radial cellule clouded along the edges ; the nervures black. ♂. Length, 3 mm.

Kuching, Borneo (John Hewitt, B.A.).

The sculpture of the head and thorax is pretty much as in *P. punctulatus* described above, but the apical slope of the metanotum is very different ; it is surrounded by a stout keel, rounded above ; the upper half of the area formed by it is opaque, and is bordered below by a stout transverse keel ; the lower part is shining and has a few longitudinal striæ. The first segment of the abdomen is clearly separated, and is stoutly, longitudinally striated.

MELITÆA AURINIA, &c., AT BARCELONA.

By W. G. SHELDON, F.E.S.

JOURNEYING down to Andalusia last spring, I rested for a few days at Barcelona, and whilst there put in two mornings, April 6th and 7th, on the slopes of the suburb of Tibadabo amongst the butterflies.

The climate of Barcelona in the spring resembles that of the French Riviera, and the majority of butterflies found are common to both; my observations, however, would seem to show that at Barcelona the emergence is a week or two earlier than on the "côté d'azur," such species as *Thestor ballus* and *Nomiades melanops* being practically over at the time of my visit.

The number of species observed in the imago stage was only twelve, and consisted of *Polyommatus alexis*, *Colias edusa*, *Euchloë euphonides*, *Pararge megæra*, *Anthocharis belia*, *Pieris rapæ*, *P. brassicæ*, *Cænonympha pamphilus*, *Thestor ballus*, *Thecla rubi*, *Nomiades melanops*, and *Euvanessa antiopa*.

My chief object, however, at Tibadabo was to make a search for the larvæ of the fine Spanish form of *Melitæa aurinia* var. *iberica*, the imago of which, a few years ago, Messrs. Jones and Standen had found there later on in the season.

After prospecting the neighbourhood, I came to the conclusion that the waste ground round the foot of the inclined railway which takes one up to the summit, and which has an altitude of perhaps 1000 ft., was a likely spot; but a search of two hours or so on the first morning of all the likely food-plants I could discover, including various species of *Centaurea* and *Scabiosa*, one of which closely resembles the favourite pabulum of the species at Hyères, if not actually it, was a total failure; and except for an odd pupa found under an overhanging rock I did not see any signs of my quest on that day. The next morning, immediately on commencing to search on the same ground, I found a full-grown larva at rest on a *Centaurea* plant, which, however, did not show signs of having been eaten. For a long time this was my only success, and I was on the point of giving up when my attention was directed to a trailing climber covering a large hazel bush eaten wholly bare of leaves by some larva. But an adjoining bush was overgrown by the same climber, which I then saw was a species of *Lonicera*, very like, and probably identical with, the *Lonicera* which is the usual pabulum of *Limenitis camilla*. This at once called to my recollection that Canon Zapater, in his 'Catalogue of the Lepidoptera of the Province of Teruel,' speaks of a small race of *M. aurinia* found near Albarracin, the larva of which feeds upon *Lonicera*, one species of which is of course often used as a captivity food-plant of this species in Britain. This hint very soon led to my finding a batch of larvæ of un-

doubted *M. aurinia* on a *Lonicera* bush, and further search on adjoining bushes revealed the fact that the larvæ were in enormous numbers, and I suppose I must have seen on a space of one acre several thousand examples of all sizes, from half-grown to those ready to pupate. I contented myself with some five dozen of the largest; and these emerged whilst I was at Granada in the middle of May.

From the above observation, with Zapater's note, it would appear that the natural food-plant of *M. var. iberica* is *Lonicera* sp., and not the more usual plants frequented elsewhere than in Spain.

The resultant imagos are the most brilliant terra-cotta forms I have seen of *M. aurinia*, the intensity of the terra-cotta in some of the examples being quite startling and most beautiful. Judging from the extensive series in the British Museum, which does not contain anything so brilliant in colour as my Barcelona specimens, I should call them an extreme form of *M. var. iberica*.

Youlgreave, South Croydon: Oct. 28th, 1908.

THE *ATHALIA* GROUP OF THE GENUS *MELITÆA*.

BY GEORGE WHEELER, M.A., F.E.S.

(Concluded from p. 270.)

Thus in the Rhone Valley, at some 1500 ft. above the sea, *parthenie* is of average size (about 36 mm.), and there is little difference between the two broods; above Caux, at some 3500 ft., where it has become single-brooded, it is very noticeably larger; whilst round Bérissal, at a little over 5000 ft., the specimens are smaller than in the Valley. (*Varia*, by the way, does not begin to appear till some 1200 or 1500 ft. higher still.) In accordance with the same rule, in the lower parts of the Jura, where *parthenie* is still double-brooded, both broods are decidedly smaller than in the Rhone Valley. On the other hand, as one would expect, the mountain forms of *athalia* and *dictynna* are, as a rule, progressively smaller than those of the plain. The difference in the size of *aurelia* in the Rhone Valley and in the mountains is not noticeable, and the advantage is, if anything, on the side of the mountain specimens, but this apparent exception is in reality merely a confirmation of the rule, for the feeding-time of the larva is made as long or longer in the mountains by the great difference between the times of emergence at different altitudes, this species appearing late in May at Sion, at the end of June below Bérissal, and not until late July at Zinal—a much greater

difference than is usually caused by altitude in other species. What has been said of altitude is also true, in a general way, of latitude, but in both cases there are various further points to be taken into consideration, such as the suitability of the environment to the food-plant, the length of time which the snow generally remains, the amount of possible daily sunshine, the chilling effect of the near neighbourhood of glacier-torrents, &c. It is possibly in connection with the first of these considerations that *athalia*, in the neighbourhood of the Italian Lakes, is smaller than the usual mountain form, those from Cadenabbia, for instance, being smaller than specimens from Faido far up the Leventina. It seems hardly possible that my specimens from the former locality, taken towards the end of July and not very fresh, could belong to a second brood; and, indeed, Rühl has remarked on the smallness of the Tessin and Lombardy specimens as compared with those from further north. With very few exceptions it is useless to give definite rules for the times of appearance of the different species, in consequence of the great extent of the habitat of many of them both in altitude and latitude. Such rules as can be laid down must be vague and comparative. It may, however, be said that *asteria* and *varia* never descend low, probably not below 6000 ft. at most, while *britomartis* and *deione* never mount high, nor does the latter go far north, the Rhone Valley being quite its limit. *Asteria* is to be found from the beginning of July till at least the middle of August, and *varia* from the middle of July for about a month. *Parthenie* emerges before *athalia*, and in the plains is generally over when the latter appears, but the higher or the further north one goes, the more they may be expected to overlap, though, in my experience, *parthenie* is always the earlier, even where it is single-brooded. In the Rhone Valley it may be expected about the middle of May, and again about the middle of August. In the same district *aurelia* appears a few days later, *berisalensis* and *dictyuna* at the beginning, and *athalia* in the middle of June, the first-named appearing again about the third week in August or a little later. *Britomartis* at Reazzino appears fairly early in June and at the end of July. From these dates it can be more or less calculated at what time the emergence of a species may be expected as we rise higher or advance further north, though, as previously stated, many local circumstances, as well as the forwardness or otherwise of the season, must be considered. It may also be added that, with the exception that *deione* appears in South France in May, none of the species can be expected to appear further south much earlier than their Rhone Valley dates; altitude has, moreover, in general a more retarding effect than latitude.

WING-MARKINGS ARRANGED IN TABULAR FORM.

	DRIONE.	VAT. BERL- SALENSIS.	ATHALIA.	PARTHENE.	VARIA.	ACRELLA.	BRITOMARTIS.	DICTYNNA.	ASTERIA.
Up. s. f. w. Bor- der.	Sometimes divided.			Sometimes divid- ed.		Often divided in ♀.	Often divided.		
Lunules.	3rd projects noticeably inwards.	3rd projects noticeably inwards. Small.	3rd projects no- ticeably.	3rd does not pro- ject noticeably.	Replaced by quad- rate spots. 3rd rarely projects at all. In ♀ some- times more dots.	3rd projects no- ticeably.	Distinct but nar- row; lowest often missing. 3rd pro- jects.	Often all but 3rd suppressed, espe- cially ♂; some- times all.	Light; generally quadrate spots. 3rd rarely projects and often is not the largest.
Subter- minal lower two- thirds.	Fine and dis- tinct; inner almost straight in lower two- thirds.	Inner as in <i>drione</i> .	Both usually ra- ther thick. In- ner bowed in- wards and again outwards in lower two- thirds.	Further apart than in other spe- cies; inner, when distinct, nearly straight in lower two-thirds.	Inner in ♀, and in ♂ when present only slightly bowed out near costa, and thence nearly straight.	Generally broad in ♂. Inner less bowed at costal than in any other, but <i>varia</i> and <i>britomartis</i> , and bends slightly outwards at in- ner margin.	Inner approaches Outer often more most in shape to <i>aurelia</i> , but on the whole the straightest of the group.	Outer rather sharply angled outwards nearly half-way down; inner not much bowed as in <i>athal-</i> <i>ia</i> .	
Elbowed line.	Fine but con- tinuous, not usually much bowed in- wards.	Not much bowed in- wards.	Very much bowed inwards.	Sometimes only costal third pre- sent, running in- to inner subter- minal.	Much straighter than in any other species.	Moderately curv- ed; costal part into inner sub- terminal.	Variable, moder- ately curved; very sometimes broad, or included into inner subtermi- nal.	Moderately bent. Sometimes appears to run into inner subter- minal.	Thick and much bent. Sometimes appears to run into inner subter- minal.
Marginal blotch.	Very variable, shaped like <i>x</i> or placed sideways, ways, or some part of this form.	Shaped like <i>x</i> or placed sideways.	Variable; often large and thick, sometimes al- most wanting.	Generally small.			Broad and thick; sometimes a black <i>x</i> or a black blotch containing an <i>x</i> of ground colour.	Generally includ- ed in suffusion. sometimes even as in <i>berisalensis</i> .	Very variable. Sometimes even as in <i>berisalensis</i> .

	DEIONE.	VAR. BERI-SALENSIS.	ATHALIA.	PARTHENIE.	VARIA.	AURELIA.	BRITOMARTIS.	DICTYNNA.	ASTERIA.
Stigma.	Outlined; more or less oval.	Oval; outlined.	Long and narrow; often filled with black.	Circular, oval, or reniform; nearly always outlined.	Large, outlined in ♂; in ♀ generally filled with dark.	Clearly defined and enclosing darker shade of ground colour.	As in <i>utholia</i> , but rarely filled with black.	Rather narrow; nearly always filled with black.	Very variable in shape, outlined or filled in.
Basal lines.	Distinct on both sides of median nerve.	As in <i>detone</i> .	Only conspicuous above median nerve. Space between often black.	Upper part fairly conspicuous; often forming a reniform stigma.	Upper part fairly distinct. In ♀ encloses dark scales.	Generally encloses a darker shade.	Strongly marked; sometimes enclosed space is black.	Generally included in suffusion; when visible filled in with black.	Often included in suffusion, if not, filled in with black.
Up. s. h. w. Border.	Rather broad.	Very broad, often nearly filling lunules.		Sometimes divided as in f. w.	Broad and suffused in ♀.	Often divided, especially in ♀.	Less often divided than in the f. w.	Broad and suffused.	Occasionally slightly divided.
Outer line.	Narrow, often very fine.	Often joins the border.	Sometimes encroaches on the lunules. Very variable in breadth.		Clearly defined in ♂, thick and suffused in ♀.		Very variable in breadth.	Often obscuring the lunules in ♂, less often in ♀.	Generally thick.
Inner line.	Less fine than outer.	Clearly defined.	Very variable in breadth.	Usually further from outer than in other species.	Sometimes clear in ♂, often indistinct. In ♀ like outer.	Usually much broader than outer.	Very variable in breadth.	Very rarely clear.	Generally thick.
Extra line.	Complete and generally double; rather fine.	Complete and clearly defined.	Frequently absent.	Rarely indicated except in centre.	Lower half usually indicated in ♂; not in ♀.	Present but often included in basal suffusion.	Upper part generally clear of suffusion.	Very rarely visible.	Covered by suffusion.
Discal spot.	Often continued into a band.	Generally joins extra line and makes a spot of ground colour.	Sometimes absent or included in basal suffusion.	Rarely indicated.	Rarely present in ♂, never in ♀.	Generally present but often included in suffusion.	Generally clear of the suffusion.	Invisible.	Invisible.

	DYKONE.	VIR. DEH- SALENSIS.	ATHALIA.	PARTHENIE.	VARIA.	AURELIA.	BRITOMARTIS.	DICTYNNA.	ASTERIA.
Basal spot.	Conspicuous, being often part of a band.	Inconspicuous, often forming part of a band.	Generally circular and very conspicuous.	Inconspicuous, often double.	Generally covered by basal suffusion.	Double, generally visible in ♂, sometimes in ♀.	Clear and generally conspicuous.	Rarely visible, but sometimes distinct in ♀.	Generally covered, but sometimes conspicuous.
Basal suffusion	Scarcely any.	Almost confined to lower half of wing.	Often includes extra line and discal spot.	Almost confined to lower half of wing or nearly absent.	Large in ♂, often reaching to inner line in ♀.	Frequently in ♂ and nearly enclosed in ♀ by extra line and discal spot.	Rarely including more than lower part of extra line.	Nearly always in ♂, and often in ♀ extending to inner line at least.	Includes extra line and discal spot.
Un. s. f. w. Border.	Inner edging line often bears flattened triangular spots.	Inner edging line forms series of black lunules.	Inner edging line more or less arched between nervures.	Inner edging line scarcely arched.	Inner edging line barely visible in ♂, sharply angled in ♀.	Inner edging line very indistinct; only arched in 3rd space above anal angle.	Inner edging line arched or angled.	Inner edging line much angled.	Only one edging line, the outer.
Lunules.	Very narrow and inconspicuous.	Very light, especially at costa.	Light, especially at costa.	Most are pale.	Only light at costa in ♂, all in ♀.	Light, especially at costa.	Narrow but light and clearly marked.	Usually much lighter than border.	Rather squared and very light.
Subterminal lines.	Both very narrow; outer or broadest at anal angle, inner only at costa.	Outer most conspicuous at anal angle, inner only at costa.	Outer very conspicuous at anal angle, inner only dots at costa.	Outer scarcely more conspicuous at anal angle; inner often clear throughout.	Outer generally indistinct and inner absent in ♂; outer distinct and inner visible in ♀.	Outer clear and dark, inner very indistinct except at costa.	Outer conspicuous but rather suffused; inner pronounced in ♂, visible in ♀.	Outer a dark suffusion, especially at anal angle, inner generally visible as a darker shade.	Outer shows as edging to lunules, inner at least as a darker shade.
Elbowed line.	Generally 4 costal spots.	4 costal spots.	3, 4, or more costal spots.	2 costal spots; sometimes traceable throughout.	Very distinct costal spots in ♂; slight or absent in ♀.	Costal spots or rings.	Distinct and pronounced throughout.	Usually costal spots.	Sometimes only on margins, sometimes distinct throughout.
Marginal blotch.	Generally a small black streak, but sometimes Y- or V-shaped.	Generally x-shaped.	Very variable.	Small, pointing upwards.	Very distinct in ♂, small or absent in ♀.	Distinct.	Not large, often Y-shaped.	Generally visible, often clear, not on up. s. large.	Very variable as on up. s.

	DEIONE.	VAR. BERTI-SALENSIS.	ATHALIA.	PARTHENE.	VARIA.	AURELIA.	BRITOMARTIS.	DICTYNSA.	ASTERIA.
Basal marks and stigma.	Generally faint.	Generally faint.	Distinct, stigma narrow.	Lower part of stigma and upper of lines clear. Basal dash often conspicuous in ♂.	All black and distinct in ♂, especially basal dash. Generally absent in ♀.	All generally distinct in ♂, less so in ♀.	All clear and pronounced. 3 basal lines.	All clear and distinct, even in absence of other marks. 3 basal lines.	All clear.
Un. s. h w. l. r. minimal band.	Inner edging line of border slightly angulated, often faintly marked.	Row of black lunules on inner edge of border.	Both edging lines of border more or less arched.	Both edging lines of border more or less arched. Very variable.	Edging lines scarcely, if at all, arched.	Inner edging line of border very slightly arched.	Inner edging line angled or arched. Lunules vary much in size.	Inner edging line of border arched, especially at costa.	Inner edging line Only outer edging of border arched. line. Band very broad.
Outer band.	Orange lunules bordered with yellow. Upper part scarcely less distinct.	Upper spots only slightly less distinct	Upper spots conspicuously lighter.	Upper spots of more undecided pattern.	Upper spots scarcely differ from the rest. Lunular part narrow in ♀.	Lunular part narrow and flattened. Much lighter than in other species.	Dark spots in lunules. Pattern interrupted towards costa, generally very markedly.	Dark spots in lunules. Pattern somewhat interrupted towards costa.	Very variable in form, proportion of parts, and colour.
Central band.	Both parts of the same shade. 3rd and 4th spots project somewhat outwards.	Both parts of the same shade. 3rd and 4th spots project somewhat.	Inner part the darker, outer of shade of terminal lunules. 3rd and 4th spots somewhat projecting.	Inner part darker than outer. Latter of shade of terminal lunules. 3rd and 4th spots often project considerably.	Inner portion darker and of same shade as terminal lunules in ♂, sometimes in ♀. 3rd and 4th spots scarcely project.	Inner portion darker, outer of shade of terminal lunules. Breadth of two parts very variable. 3rd and 4th spots project somewhat.	Inner portion darker; outer of shade of subterminal lunules. 3rd and 4th spots greatly projecting sometimes quite outside the rest of the row.	Inner portion darker; outer of shade of subterminal lunules. 3rd and 4th spots project often rather conspicuously.	Unicolorous; the black dividing line slight or even absent.
Inner band.	Light spot roughly triangular.	Light spot triangular.	Light spot very variable, but not triangular.	Often ill-defined. Light spot small and narrow.	Well-defined. Light spot small or absent in ♂, but not in ♀.	Light spot small.	Light noticeably broad in centre, and light spot large.	Light spot variable, but rarely very large.	Not generally broad in centre. Light spot very variable.
Basal band.	Central spot generally small in ♂; 5th absent.	Central spot very small; 5th absent.	Central spot very variable in size.	Central spot small.	2nd and often 4th spots conspicuously large.	5th spot usually present.	Central spot rarely conspicuously small.	Central spot rarely noticeably small.	2nd spot conspicuously the largest.

NOTES AND OBSERVATIONS.

MALACOSOMA NEUSTRIA ab.—As the process block, reproducing the photograph of this interesting aberration of *M. neustria*, did not print clearly in the text (*antea*, p. 257), Messrs. West, Newin & Co. have very kindly reprinted the figure on plate paper. The curious way in which the central lines of the fore wings run together below the middle can now be plainly seen. It may be mentioned that somewhat similar aberration in the transverse lines has been noted in *M. castrensis*.

ACIDALIA HUMILIATA REARED FROM OVA.—I think it is perhaps worth recording that I have recently bred *A. humiliata* from ova to the perfect insect, two lovely specimens emerging about a fortnight ago. I took the insect during my stay at Freshwater in June, and succeeded in getting some fifty or sixty ova. They fed up well until about half-grown, and then appeared to be undecided whether to feed up or hibernate; a few chose the former, and I sent a couple of full-grown larvæ to be figured, and two imagines emerged as before stated. I am afraid the remainder will not survive the winter.—R. TAIT, Jun.; Roseneath, Ashton-on-Mersey, Cheshire.

THE HYBERNATION OF GONEPTERYX RHAMNI.—In 1904 I sent you a note on this subject (see Entom. xxxvii. 141), in which I surmised that a female specimen I found sitting exposed on *Jasminum nudiflorum* on the morning of January 17th had crept out from some neighbouring ivy to which she had retired for her winter sleep. The truth of this hypothesis was curiously confirmed on October 29th, 1908. At 11.0 a.m. in brilliant sunshine I noticed a very fine and perfect female *G. rhamni* fluttering around some ivy on the south side of my house. I sat down on a garden-seat close by and watched her carefully. She spent ten minutes in basking on the ivy-leaves, or on those of *Vinca major* growing in a bed beneath, flying occasionally round the sunless eastern corner, evidently examining the ivy with which it is covered. Into a fairly large gap in this ivy she finally retired at 11.10 a.m.; there no doubt to pass through a period of torpidity not likely to be broken by the feeble wintry heat of eastern suns.—Rev. G. H. RAYNOR; Hazleleigh Rectory, Maldon.

NEPTICULA ACETOSÆ IN SURREY.—Reading in last month's 'Entomologist' (p. 254) that at a meeting of the South London Entomological Society Mr. Sich exhibited mines of *Nepticula acetosæ* from Surrey, I walked over to the nearest station for its food-plant, about a mile from here, and, after a short search, found the unmistakable circular blotch-like mines of this most diminutive creature; they were, however, by no means common. I found seven or eight after half-an-hour's search. How often is one tempted to go a long railway journey in search of some desirable species when it may sometimes be found close to one's door!—A. THURNALL; Thornton Heath, November 5th, 1908.

SYRPHIDS KILLED BY FUNGUS.—Once or twice at the end of September and beginning of October last on Esher Common, Surrey, I met with several dead Syrphid-flies, *Melanostoma scalare*, Fabr., on the

flower-heads of the tall grass, *Molinia cærulea*, Mönek. Apparently all that were brought away were females. They were found to have fallen victims to a fungus-parasite, *Empusa musca*, Cohn. It was rather curious that the flies were often attached to the grass by the anterior point of the head only.—W. J. LUCAS; 28, Knight's Park, Kingston-on-Thames.

TORTRIX PRONUBANA ON YET ANOTHER FOOD-PLANT.—In a garden where I had previously taken *Tortrix pronubana* on *Euonymus*, I found, in September last, three *Tortrix* larvæ feeding in rolled leaves of *Chrysanthemum*, on which plant they readily fed up, and ultimately produced *T. pronubana*. Although the species is known to affect a wide range of food-plants on the Continent, it appears to have been previously found only on *Euonymus* in this country, and so far as I am aware this is the first instance of it having been found wild on any of the Compositæ.—ROBERT ADKIN; Lewisham, November, 1908.

COLIAS EDUSA, &c., NEAR EASTBOURNE.—It was not until August 30th that I had the chance of looking after the butterflies on the south-east corner of the South Downs. By this time the "season" was practically over in that neighbourhood, the stormy weather of the latter half of the month having put the finishing touches to a somewhat early summer. However, that day happened to be a very fine one, and in the course of a ramble of a couple of hours' duration some six examples of *Colias edusa* came under my notice; all of them, with the exception of one that evaded both capture and examination, proved to be males in more or less battered condition. One youngster that I met confessed to having taken nearly a score on one day earlier in the month, and during my subsequent peregrinations one or two specimens were seen almost daily until September 19th. The only one that I definitely ascertained to be a female was taken on September 11th, and was in an equally dilapidated condition as the males. Among the other "alien" species, *Vanessa atalanta* was fairly frequent; anything from one to four or five individuals were to be seen on any day up to September 7th, when I left the neighbourhood; but during the whole of my stay I saw only some half-dozen examples of *Cynthia cardui*. *Plusia gamma* was always common but never abundant, and only one example of *Nomophila noctuella* was met with.—ROBERT ADKIN; Lewisham, November, 1908.

CAPTURES AND FIELD REPORTS.

COLIAS EDUSA IN CUMBERLAND.—A male specimen of *C. edusa* was captured on October 13th last, near this city.—M. C. DIXON; 208, Warwick Road, Carlisle.

ACHERONTIA ATROPOS IN THE CO. WATERFORD.—A fine specimen of the Death's-head hawk-moth was taken about two miles from here, on the 9th October last, and given to me. It was alive when I received it, but although I listened attentively for its cry or squeak, it never uttered one. It must have only just emerged from the pupa when captured, as the wings were quite fresh and perfect.—(Rev.) WILLIAM W. FLEMYNG; Coolfin, Portlaw, Co. Waterford.

ACHERONTIA ATROPOS IN LANCASHIRE.—A female specimen of *A. atropos* was captured here on October 9th last, and another example of the same sex on the 16th of that month.—T. BAXTER; Min-y-don, St. Anne's-on-Sea.

PÆCHILOCAMPA POPULI IN OCTOBER.—I took a specimen of *P. populi* from off a street-lamp here, on October 23rd last. Is not this a very early date?—EDWIN P. SHARP; 1, Bedford Well Road, Eastbourne.

[This species is perhaps more frequent in November and December, but it has been met with by others in the month of October.—ED.]

PYGERA ANACHORETA IN ESSEX.—I see in 'Entomologist' for October, p. 250, that Mr. George P. Kitchener records the occurrence of this species at Clacton, and observes that it appears to be a new locality for the species, so he and other readers of your magazine may be interested to hear of a previous capture in this county. On September 26th last year, when beating for larvæ in a wood in this neighbourhood, I found half a dozen larvæ of what I thought were *P. curtula*, spun up between leaves of aspen. They were rather small, and I did not examine them very carefully. When I got home they were sleeved on a branch of a poplar-tree in my garden, and left there until they had become full-grown and had spun up, when the cocoons were removed and placed in one of my breeding-cages. From these, the following May, I bred two *P. anachoreta*, both males; one *P. curtula*; and three *P. reclusa*.—GERVASE F. MATHEW; Dovercourt, Essex, November 3rd, 1908.

LEUCANIA VITELLINA IN SOUTH DEVON.—This species was taken rather freely here during September. My brother has captured some, and a Paignton collector informs us that several were secured in his neighbourhood. This is the first year we have seen more than one specimen during the season.—J. WALKER; 3, Goodwin Terrace, Carlton Road, Torquay.

AGROTIS LUNIGERA IN NORTH WALES.—I have to record the capture, at sugar, of two specimens of *A. lunigera*, at Penmaenmawr. This I believe to be the first record for the species in that locality, although I have taken it before at Abersoch.—R. TAIT; Ashton-on-Mersey, Cheshire.

AGROTIS CINEREA IN ISLE OF WIGHT.—*A. cinerea* was taken in larger numbers than usual at Freshwater this year, though they were already showing signs of wear when I arrived on June 11th. I have also had some success in breeding *A. agathina* this year, finding that the larvæ reared in a frame exposed to sun and with plenty of side ventilation did much better than those reared in partial shade and with top ventilation only; many of these went mouldy whilst in pupa.—R. TAIT, Jun.

EPUNDA LICHENEA IN SUSSEX.—This species has occurred sparingly in the neighbourhood of Eastbourne this season; one at light on October 1st, and a female at ivy on the 14th. I obtained about one hundred ova from the latter. A previous occurrence at Abbots Wood, some years ago, is recorded, but with no further data, and I have heard of none since.—EDWIN P. SHARP; 1, Bedford Well Road, Eastbourne, Sussex, October 24th, 1908.

TENIOCAMPA STABILIS IN NOVEMBER.—On the evening of Nov. 5th I was much surprised to come across a specimen of *T. stabilis* on ivy bloom. I do not recollect ever having previously taken this species in the autumn. —EDWARD GOODWIN; Canon Court, Watlingtonbury.

[Barrett mentions a specimen of *T. murula* that had been taken at ivy in October, at Chesham in Bucks; he adds, "it is the size of *T. stabilis* but well marked."—ED.]

CIRRIEDIA XERAMPHELINA IN SURREY.—As this species has rarely been recorded from Surrey, I may mention that I captured three fine specimens at light, on Kingston Hill, September 14th and 16th last. One female I scooped on ash in the garden here, and she deposited a number of eggs, several on the gauze of the sleeve in which she was enclosed. During the last three years I have taken altogether about eight specimens of *C. xerampelina*, and I have heard of others captured in the neighbourhood, both this year and in 1907. —PERCY RICHARDS; Wellesley, Queen's Road, Kingston Hill.

CAPTURES AT LIGHT, KINGSTON HILL, SURREY.—Many species have been plentiful this autumn, among which may be mentioned, *Ennomos fuscantaria*, *H. alniaria* (*liliaria*), and *E. quercinaria* (*angularia*). Of *E. erosaria* I have only seen two specimens. —PERCY RICHARDS; Wellesley, Queen's Road, Kingston Hill.

DRAGONFLIES ON THE NORFOLK BROADS.—I was on the Broads for a few days about May 30th this year. *Orthetrum cancellatum* was well out and in good numbers along the dykes, on the plank bridges over which it is very fond of basking. *Cordulia aenea*, *Libellula quadrimaculata* (very variable in this district), *Brachytron pratense*, and *Erythromma najas* were also observed. *Æschna isosceles* was just appearing, as also was *Libellula fulva*. I visited the Broads again from June 18th to 24th. The weather was very bright and sunny, though rather windy. Dragonflies were abundant. *O. cancellatum* were swarming, and where the fen had been cut along the dyke-sides were to be found basking on the dry grass, &c. *L. fulva* and *Æ. isosceles* were in good numbers, but appeared to keep more to the main streams, hawking along the edge of the reed- and typha-beds. They are very wary and difficult to approach, and it is not an easy matter to net them from a boat. Late one afternoon we found several *Æ. isosceles* hawking about the sunny side of a large alder carr standing back from the river, which was sheltered from the wind, where also some females of *L. fulva* were observed. Females of *L. fulva* when first out seem to be partial to the open fen, often a long way from the main stream. They hawk round the small clumps of willow and alder and are easy to catch, but if one is seen along the river it is generally rather battered, and is busy laying eggs, which are dropped at random into the water. *O. cancellatum* also flies when laying, and just touches the surface with the end of its abdomen. *Æ. isosceles* rests on some floating rubbish, and thrusting its abdomen beneath the water appears to place its eggs carefully. —H. M. EDELSTEN; October 20th, 1908.

ACRONYCTA AURICOMA AT DOVER.—On the principle of "better late than never," I wish to record that I took two wasted specimens of *A. auricoma* in a wood near Dover on the same tree at sugar on

June 13th, 1907. I did not think the capture worth recording at the time, but when I mentioned it to a correspondent he proved sceptical, saying that very few *A. auricoma* had been taken in the last twenty years, and suggesting that they might be a form of *A. runcicis*. This insinuation sent me with the specimens to Mr. Sidney Webb, who reassured me as to their identity. I gathered from him that Dover might be a new locality for the species. Curiously enough, the wood in question is that in which the specimen of *C. alchymista* recorded in 'Barrett' (vi. 232) was taken, and it was Mr. Webb's kindness in telling me of the locality that induced me to sugar regularly there. Needless to say, I have not found *C. alchymista* yet, nor have I seen anything more of *A. auricoma*, although I worked hard for a second brood in 1907, and for both broods this year.—(Capt.) P. A. CARDEW; St. Aldwyns, Park Avenue, Dover, November 18th, 1908.

ACHERONTIA ATROPOS IN HERTFORDSHIRE.—I had a larva of *A. atropos* brought me in August by some children who found it in Grove Road, Hitchin. This duly pupated, and a perfect insect emerged on November 1st. Another larva dug up in a potato-field was unfortunately injured and died.—R. C. GRELLET; Orford Lodge, Hitchin, Herts, November 18th, 1908.

ÆSCHNA MIXTA IN SUSSEX.—Our friend Mr. H. J. Watts, of Westminster, has been kind enough to show us a pair of *Æschna mixta* which he took at Pulborough on October 4th last. Both the specimens were very fully matured, and the wings of the female were somewhat frayed. Mr. Watts tells us that they alighted on a grassy spot, and were secured together by placing the net over them.—F. W. & H. CAMPION; Walthamstow, November 17th, 1908.

BOMBYX QUERCUS ASSEMBLING.—I had a somewhat curious experience with this moth during a fortnight's holiday spent at Treburrick, a small Cornish village lying about midway between Padstow and St. Columb, in the middle of August last year. Accompanied by my family and relatives, we set out for a walk, one dull, damp afternoon, to a small neighbouring village known as "Shop," and situated some three miles away. Our route lay along picturesque lanes, the high rocky banks of which were clothed with ferns, wild flowers, bramble, &c., and offering from time to time, through the gaps and gateways in the hedges, glorious views of the sea. My youngest son, ever on the look-out for captures, was fortunate enough to espy a freshly emerged "oak eggar," its wings not yet grown, crawling up a lichen-covered rocky bank. This he quickly secured and placed in a two-inch glass-bottomed box, and, to allow the wings to properly develop, the box was kept uncovered. Carried in this way the moth's wings gradually expanded to their full size, but owing perhaps to the prevailing moist air, or the motion caused by travelling, they remained weak and flaccid for a considerable time. On reaching "Shop" I had occasion to leave my people for a few minutes while I obtained some stamps at the village post-office, and on returning I found them in a great state of commotion. Their excitement was caused by the antics of a bright-coloured moth which persisted in flying at and settling upon my sister, who at this time was carrying the female "eggar" in the open box. I quickly took in the situation and

realized that the visitor was a male of the same species attracted by the female, and without loss of time I proceeded to box him as he sat upon my sister's waterproof cloak. Before I had time to do so, however, another male came up and then another and another, each flying with rapid gyrations around the object of their visit and eventually settling upon the aforesaid cloak. These were boxed in the same way as the first. To avoid the villagers, whose curiosity our proceedings had aroused, we passed farther along the road and quickly rigged up a net ready for fresh arrivals. For the next half-hour or so, slowly walking along the lanes with occasional stoppages, we had, at intervals of every few minutes, fresh visitants who came flying up against the wind and making for the person at the time holding the boxed female; most of these we were able to net, but some were too active for us. The afternoon drawing to a close, and the moths getting scarcer, we turned homewards, full of our adventure. On reaching our lodgings I placed the female in a cardboard box having a gauze-covered top, and as evening closed in I set out with her, accompanied by my two boys, and anticipating a renewal of our recent experiences; in this, however, I was disappointed, for not a single *quercus* put in an appearance. The next morning was too wet for walking, but in the afternoon the weather improved, and replacing the female in a glass-bottomed box, we made another excursion in quest of males. To our delight we had a renewal of our previous afternoon's experience, the males soon appearing, but in greater numbers than before, and furnishing us with plenty of sport as they came flying up against the wind and careered wildly around the boxed female; at times we had five or six to deal with at once. We soon netted a considerable number, but as the novelty wore off we became less enthusiastic in their pursuit. On returning to our lodgings we found our landlady full of excitement, for in our absence our living room had been invaded, by way of the open window, by a small swarm of male "eggars," attracted by the gauze-covered box in which the female *quercus* had passed the previous night. Although inexperienced at the game our landlady had managed to make more than a dozen captures.

During the remainder of our holiday—a further ten days or so—the female "eggar" accompanied us on most of our excursions, and our previous experiences with her were each time repeated, except that from day to day her attractive powers became gradually but perceptibly weaker. The males therefore came in lessened numbers and were more difficult to net. A few days before the end of our stay she was accidentally crushed to death, but even then still retained a limited power of attracting the males, and this power was also shared by any empty box in which she had been placed. The scent given out by the female is of a musty foxy description and quite apparent to me, and with hardly a doubt is the means by which the males are attracted. I had previously been under the impression that *quercus* flew during the evening, but our experience was to the contrary; we never saw a single male fly except during the afternoon, although we occasionally saw a female flying in the evening. We had the good fortune to find another freshly emerged female on another rocky bank, but this was

killed as soon as developed, to occupy a place in the cabinet later. -- A. J. WINDYBANK; Latchmere, Richmond Road, Kingston-on-Thames, October 14th, 1908.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON. --Wednesday, October 21st, 1908. --Mr. C. O. Waterhouse, President, in the chair. --Monsieur Charles Oberthür, of Rennes, France, was elected an Honorary Fellow of the Society. --Mr. Charles B. Autran, of the Insectarium, Kanny Koory, Silchar, P.O., Cachar, Entomologist to the Indian Tea Association; and Mr. Richard Beck, Sanderhayes, Bitterne Road, Southampton, were elected Fellows of the Society. --Mr. E. C. Bedwell exhibited examples of the rare Lamellicorn beetle, *Cnorimus variabilis*, L., found by him in thick frass under the bark of oaks near Purley, Surrey. --Mr. G. C. Champion showed a specimen of *Pytho depressus*, L., with two tarsi to the right hind leg; it was bred from a larva or pupa found under pine-bark at Binn, Switzerland. --Mr. W. G. Sheldon exhibited a case to illustrate several forms of *Thais rumina*, the var. *medesicaste*, and the ab. *canteneri*, Hey., from South Spain, and from France. --Mr. W. J. Lucas brought for exhibition a set of eight examples of *Libellula quadrimaculata* from Scotland, and the South of England, to illustrate the range from the type form to the var. *præmubila* of Newman. --Mr. H. M. Edelsten also showed a varied series of the same dragonflies from the Norfolk Broads. --Mr. L. W. Newman exhibited paintings of two forms of *Dryas paphia* bred by him this season from ova of parents taken at Brockenhurst, resembling the aberration of this butterfly shown by Dr. Herbert Charles at the last meeting. --Mr. W. J. Kaye showed a synaposematic series of specimens from Ecuador, comprising Ithomiinæ and Pierinæ. Of the former there were *Discenna zavelleta*, five males and two females, and *Leucothyris zelica*, fourteen males and no females. Of the latter there were *Dismorphia othoë*, fifteen males and six females, *Dismorphia leuconia*, seven males and one female, and *Dismorphia* sp.?, four females. He pointed out that the usual coloration of *Leucothyris* species was black and transparent, but here was one, *L. zelica*, which was yellow, and the significant fact illustrated by the exhibit was that there were in the aggregate more Pierines than Ithomiines, and, taking *L. zelica* alone, there were only fourteen specimens to the thirty-three of the associated *Dismorphias*. It appeared therefore to be quite possible that the *L. zelica* obtained its yellow colouring by the association with the Pierines, and played the part of mimic instead of model. --Mr. H. M. Edelsten exhibited a tube containing ova of *Leucania brevilinea*, *in situ*, laid within the sheathing-leaf of a dead reed-stem found in Norfolk in July, 1908. --Mr. A. Harrison showed numerous examples of *Aplecta nebulosa*, of the form *robsoni*, bred from parents taken in Delamere Forest, the proportion in breeding being as follows: grey form, 25 %; var. *robsoni*, 51 %; and var. *thompsoni*, 24 %. --Mr. A. E. Gibbs brought for exhibition a case containing a series of *Everes argiades*, taken this year at various altitudes in the Vosges region, showing a fine large form; *Lycæna bellargus*, a female, from South

Devon, with the wings on the left side, especially the secondary, splashed and streaked with male coloration; *L. icarus*, male, also taken in South Devon, measuring only 19 mm. in expanse; and an example of *Chrysophanus phileas*, approaching on the right side ab. *schmidtii*, from Harpenden, the ground colour of the primary being silvery-white, with the exception of a broad streak of copper colour extending from the base of the wing.—Mr. E. M. Dadd exhibited specimens of *Erebia ligea* from various German localities; a small series of *E. euryale*; examples of var. *adyte* taken at Zermatt and Pontresina; and of ab. *ocellaris* and ab. *extrema* from the Stiltser Joch. Among the Pontresina *adyte* was a single specimen which might be placed amongst the *ocellaris* without the slightest hesitation; although not quite so dark as any of these. The exhibit also included one specimen of the form *euryaloides* which is accredited to *euryale*, occurring with the *adyte* at Pontresina.—Mr. Dadd also exhibited examples of *Lyceena corydon*: a typical form from England, and the Thuringer Wald; var. *apennina* from the Sabine Mountains; the form from the South of France; and a form from Berlin, for which he suggested the name *horussia*, as being distinct from all other forms—first, in the male, by its greater size; secondly, in the extreme width of the black border of the fore wings. He also exhibited a pair of *Scodionia fagaria* var. *fulvillacearia*, and a typical male for comparison, this being the only form of the species occurring on the heather around Berlin; and four examples of butterflies which he suggested as hybrids, viz.: *L. corydon* × *bellargus*, from Airolo; *Canonympha satyrion* × *pamphilus*, from Wengen; *Colias hyale* × *paleno*, from Oberstdorf; and *Pieris napi* × *rapæ*, from Berlin, apparently exactly intermediate between the two species.—Professor E. B. Poulton showed a family of eight butterflies bred by Mr. G. F. Leigh, F.E.S., from ova of *Charaxes neanthes*. Seven of the offspring were *C. neanthes*, and one *C. zoolina*; thus proving, so far as such numbers constitute sufficient evidence, what has long been suspected, viz., that these superficially dissimilar butterflies are forms of the same species.—Dr. F. A. Dixey, M.A., M.D., read a paper, illustrated by lantern-slides, "On Müllerian Mimicry, and Diaposematism. A Reply to Mr. G. A. K. Marshall."

November 4th, 1908.—Mr. C. O. Waterhouse, President, in the chair.—Mr. N. P. Fenwick, Junior, of the Gables, Esher; Mr. John Spedan Lewis, of Spedan Tower, Hampstead, and 278-288, Oxford Street, W.; Mr. W. K. Lister, of Street End House, Ash, near Dover; Mr. Ivan E. Middleton, of 14, High Street, Serampore, Bengal; Mr. F. E. West, of Peradeniya, Ceylon; and Mr. J. Swierstray, First Assistant of the Transvaal Museum, Pretoria, were elected Fellows of the Society.—Mr. W. G. Sheldon exhibited examples of *Melitæa aurinia* var. *iberica*, from Barcelona, taken last May, and examples from various British and continental localities for comparison. Taking into consideration their different appearance and habits, he suggested that eventually this Catalan form of *aurinia* might prove to be distinct, or at all events a subspecies.—Mr. H. W. Andrews showed a short series of *Gymnosoma rotundatum*, L., and a specimen of *Ocyptera brassicaria*, F., two uncommon Tachinids from Glengarriff, co. Cork.—Mr. P. J.

Barraud exhibited a series of *Erebia stygne* from the French Vosges, taken in June and July this year, at 4000 ft., showing a generally brighter faces and markings than Swiss forms, and a large brightly coloured series of *Erebia lugea* from the same region, taken at 2000-2400 ft. in July. — Mr. H. M. Edolsten exhibited, on behalf of Mr. E. P. Sharpe, and Mr. A. J. Wightman, a series of *Nonagria edolsteni*, Tutt, from Sussex, taken by him in August this year, this being the first time that the species, which is quite distinct from *N. dissoluta* and the variety *arundineta*, had been observed. He also showed, for comparison, long series of *dissoluta* and var. *arundineta* from various British localities, with *N. neurica* from Germany. In pointing out the series of errors as to the identity of these *Nonagrias*, Mr. Tutt said it was necessary to rename the species that Schmidt had erroneously referred to *neurica*, Hb., and in doing so he had called it *edolsteni* (Ent. Rec., xx. pp. 164 *et seq.*), in honour of Mr. H. M. Edolsten, who had done so much towards making the differences of Schmidt's two species known to us. — Mr. H. St. J. Donisthorpe brought for exhibition *Pseudogynes* captured alive at Nethy Bridge in September last, where they occurred in some numbers in two nests of *Formica rufa*, thus indicating that *Atemeles pubicollis*, Bris., a beetle new to Britain, is to be found in Scotland. He also exhibited (a) examples of *Harpalus cupreus*, Dej., from Sandown, I.W., October, 1908; and one specimen with red legs discovered by Mr. J. Taylor at Atherstone, I.W.; (b) *Cassius cicatricosus*, Mr., from Southsea; and (c) *Cryptocephalus bipunctatus*, L., taken in July by him at Niton, I.W., in July; this form being new to Britain until discovered by Mr. R. S. Mitford at Niton last year. — Mr. R. Shelford showed a "stick" insect—apparently a new species of the genus *Melaxinus*—bred parthenogenetically by Mr. H. Main. — Mr. L. W. Newnan exhibited a case containing a long series of hybrids, *ocellatus* × *populi*. — Mr. H. J. Turner exhibited a long series of imagoes of *Coleophora virgaureæ*; flowers of golden-rod among the pappus hairs of which were ova (infertile); photomicrographs by Mr. F. Noad Clark of the ova *in situ*; photomicrographs of three varieties of the micropyle of the ovum; and larval cases *in situ* among the florets, to illustrate the life-history of the species. He also showed "nests" of the gregarious hibernating larvæ of *Porthesia chrysorrhæa* from Wakering Marshes, Essex, and stated that on several parts of the coast this species had now become very abundant again, plenty of nests being everywhere apparent; and dead flower-stems of *Statice limonium*, collected on Nov. 1st, containing the full-fed hibernating larvæ of *Coleophora limoniella*. — Mr. W. J. Lucas exhibited an example of *Labidura riparia*, Pall. (shore earwig), a large male taken near Bournemouth, Aug. 10th, 1908, and kept alive since that date; and two cells of the solitary wasp, *Eumenes coarctata*, found in New Forest on Oct. 31st, 1908, having never found two together previously. — Dr. T. A. Chapman exhibited a case containing specimens of the genera *Celastrina* (*Cyaniris*) and *Everes* to demonstrate the racial identity of *C. sikkima* and *C. argiolus*, *C. jynceana* and *C. limbatus*, *E. diparoides* and *E. argiades*. All these species occur together, and appear to form a mimetic group, but it would be impossible at present to determine which is the model, and what may be the object of the

mimicry. — Professor E. B. Poulton, F.R.S., exhibited the male and female imago, the preserved larva, and the cocoon of an interesting new *Lasiocampid* discovered by Mr. E. L. Clark near Durban; a set of butterflies captured on a patch of zinnias on February 21st, 1906, at Jinga, on the north of the Victoria Nyanza, by Mr. C. A. Wiggins, showing seventeen specimens of *Danais chrysippus*, L., of the type, and *alcippus* forms together with the intermediate examples, but no single specimen of *dorippus* (*klugei*), although of three females of *Hypolimnas misippus*, L., two were of the *inaria*, Cr., form mimicking *dorippus*. — Professor Poulton also read a letter from Mr. S. A. Neave, describing the habits of a mimetic species of *Euphædra*. — Dr. F. A. Dixey exhibited specimens of *Heliconius amphitrite*, Riff., and *H. charithonia*, Linn.; also a coloured drawing of *H. hermathena*, Hew. He remarked that each of the first two species showed a distinct and well-marked aposeme or warning character, each of them, and especially the first, belonging to an extensive mimetic assemblage. In the third species these two distinct aposemes were combined. The specimens showed how a conspicuous and distasteful form might acquire a new aposeme without relinquishing its old one, such an intermediate form presumably sharing in the protection afforded by the aposematic forms on each side of it, while the separate aposemes which it exhibited were not mutually protective. — Dr. G. G. Hodgson exhibited a series of *Polyommatus bellargus* from Surrey localities, including a partially gynandromorphous female, two-thirds of the hind wings with the typical male coloration and markings; a series of var. *ceronius* taken in 1907, and specimens showing a variant under side recurrent in the same locality. He also exhibited a series of *Zygæna trifolii* and *Z. hippocrepidis* from one locality, including twelve melanic examples of the former, with other common forms and aberrations, probably of the latter, the sixth spot being obsolete, or represented by a mere dot. — Mr. J. C. Kershaw communicated a paper on "The Life History of *Erianthus versicolor*," Brunner, an orthopteron of the family Mastacidae. — H. ROWLAND-BROWN, M.A., Hon. Secretary.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. — October 22nd, 1908. — Mr. Alfred Sich, F.R.S., President, in the chair. — Mr. McArthur exhibited a long series of *Argynnis aglaja* and fine specimens of *Asteroscopus nubeculosa*, from Aviemore. — Mr. Tonge, bred specimens of *Pieris brassicae* with partial black margin to hind wings, *Cerura bifida* bred from a Reigate female, a very varied series of *Agrotis cursoria* from Lowestoft, and a long series of *Hydræcia nictitans* from the same place. — Messrs. Harrison and Main, a bred series of *Nemeobius lucina* from ova, Horsley; and two larvæ of *Limenitis sibylla* in their curious hybernacula, on sawfly, from the New Forest. — Mr. Hodgson, a large number of *Pieris rapæ*, illustrative of the experiments he was making on the species. — Mr. R. Adkin, series of *Rhodophaea suavella* and *R. marmorea*, with branches of blackthorn showing their larval webs, from Eastbourne, and read notes on the species; a specimen of *Peronea permutana* bred from a larva taken on *Rosa spinosissima* at Beachy Head; and unusually light and dark forms of *Tortrix heparana* from the same

locality and Lewisham. — Mr. Newman, a series of *Dicranura bicuspis* bred from Tilgate Forest, and an example of *Abaxas grossulariata* ab. *varleyata*, female, just bred as a second brood. — Mr. Main, sprays of blackthorn on which were ova of *Ruralis betula*. — Mr. Smith, *Plodia interpunctella*, found in the Society's Library just previous to the meeting. — Mr. Rayward, a specimen of *Epinephele jurtina*, with considerable pallid areas, and male and female specimens of *E. lithonus*, with additional spots on the fore wings. — Mr. F. Noad Clark, under the microscope, the early instars of *Nola albulalis* larvæ, and the ova of *Coleophora virgaureæ* in situ among the pappus hairs of golden-rod. — H. J. TURNER, *Hon. Rep. Sec.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY. — October 6th. — Mr. J. A. Clark exhibited *Camptogramma bilineata*, Margate, July, 1908, including a specimen with broad black band on fore wings. — Mr. H. M. Edelsten, *Sterrhia sacraria*, South Devon, September, 1908. — Mr. G. H. Heath, six *Grammesia trigrammica* var. *bilinea*, Kent, June, 1908, taken on two evenings, on two sugar patches close to one another, while the rest of a somewhat extensive "round" yielded no examples of this form. — Mr. L. W. Newman, *Lycæna corydon* var. *obsoleta*, Dover, 1908; also a long series of *Bombyx castrensis*, including unicolorous yellow males and females. — Mr. L. B. Prout, a large, dark, strongly marked ab. of *Eupithecia expallidata*, Tunbridge Wells, and a strongly black-marked ab. of *Nonagria sparganii*, East Kent; also, on behalf of Mr. J. Taylor, an extraordinary Agrotid, apparently an ab. of *Agrotis segetum* female, with dark clouding round the pale stigmata, October 3rd, 1907. — Mr. A. Sieh, cocoons of *Cemistoma laburnella*, showing strength of silk in bending materials on which the cocoons were spun; also mines in leaves of *Rumex acetosa* from Richmond, containing larvæ of *Nepticula acetosæ*. — Mr. P. H. Tautz, series of *Leucania vitellina*, August 15th to 30th, Dorsetshire coast, 1908. — Mr. A. J. Willsdon, ovum, pupæ, imagines, and ichneumon of *Alucita graphodactyla*; also its food-plant, *Gentiana premonantha*.

October 20th. — Messrs. H. Leach, of Rickmansworth, and F. Pennington, of Cranleigh, were elected members of the Society. — Mr. A. Bacot exhibited pupæ of *Euchloë cardamines* attached to twigs and cards of various shades; these pupæ showed distinct gradations in depth of colour, corresponding to the lightness or darkness of the substance on which they had pupated. — Dr. T. A. Chapman, *Tamagra atrata* var. *pyrenaica*, bred from Gavarnie ova. — Mr. H. M. Edelsten, ova of *Leucania brevilinea*, laid within sheathing leaf of dead reed-stem, Norfolk, July, 1908. — Mr. W. J. Kaye, dead pupa of *Lycæna arion*, one of several found by Mr. Percy Richards under stones near Bude. — Mr. L. W. Newman, *Hepialus humuli* var. *heilandica* from Shetlands, showing considerable variation; *Anarta melanopa*, from the same locality; and abs. of *Chrysophanus phloææ*, Bexley, October, 1908, including a specimen with greyish black under side and female with usual bands on hind wings obsolete. — Mr. P. H. Tautz, bred series of *Stauropus fagi*, from Chalfont Road ova, including dark female. — S. J. BELL, *Hon. Sec.*

RECENT LITERATURE.

British Oak Galls. By EDWARD T. CONNOLD, F.Z.S., F.E.S. Author of 'British Vegetable Galls,' &c. Illustrated with 68 full-page plates, 21 insets, and 17 small drawings. Pp. i-xviii and 1-169. London: Adlard & Son. 1908.

THE subject-matter in this very excellent book is arranged in six chapters, the first five of which are respectively headed "The Principles of Oak Gall Formation" (pp. 1-8), "Some Features of Oak Gall Growth" (pp. 9-19), "The Numerical Aspect of Oak Galls" (pp. 20-25), "The Cynipidæ Affecting the Oak" (pp. 26-32), and "The British Oak" (pp. 33-39).

Chapter vi. commences with some useful hints on collecting and mounting oak galls (pp. 40-48). The softer galls unfortunately soon lose both form and colour. In such cases the author recommends carefully coloured drawings, or photographs, showing the objects in their actual size, as affording the best permanent records of their appearance in nature. On p. 49 a table of British Cynipidæ gall-producers and, where known, their alternate generations, is given. Of six species the sexual generation only seems to have been detected, and of seven others the agamous form alone appears to be known. We observe that *Neuroterus schlechtendali*, Mayr, is cited as a synonym of *Spathegaster aprilius*, Giraud. Schlechtendal and F. Loew, however, consider *N. schlechtendali* to be the agamous form of *S. aprilius*, and we believe that evidence has been published tending to show that the former is the summer gall. Anyway, our author inclines to the opinion held by Adler that the alternate generation is most probably *Neuroterus ostreus*, Hartig. Descriptions of the fifty-four British Oak Galls and remarks thereon occupy ninety-one pages, and in the case of each gall there is a synoptical table in which a great deal of information is presented in a handy form. The illustrations are admirable, and, with one or two exceptions, are from photographs of specimens obtained around Hastings.

Galls are of interest not only to the specialist who studies the insects producing them, the inquilines and the parasites, but also to Nature students generally. Their various forms and curious manner of growth always attract attention. Pictorial aid in the identification of the oak species and trustworthy information concerning them are now at the service of all who furnish themselves with a copy of Connold's 'British Oak Galls.'

Diptera Danica. Genera and Species of Flies hitherto found in Denmark. By WILLIAM LUNDBECK. Part II. Asilidæ, Bombyliidæ, Therevidæ, Scenopinidæ. With 48 figures. Pp. 1-160. Copenhagen: G. E. C. Gad. London: Wesley & Son. 1908.

THE first part of this capital work (published at the expense of the Carlsberg Fund) was referred to in the 'Entomologist' for 1907, p. 264. There are synoptical tables of the subfamilies, genera, and species, and the sequence of the families and of the species embraced therein is very similar to that in Verrall's 'List of British Diptera,'

the second edition of which was published in 1901. Genera are discussed at some length, and the descriptions of species are ample. The dipterous fauna of Denmark appears to be closely identical with that of our islands, and, as the work under notice is printed in English, it should secure the attention of British students of this Order of the Insecta.

A Preliminary List of Hertfordshire Diptera. By A. E. GIBBS, F.L.S., F.E.S., and PHILIP BARRAUD, F.E.S.

WE are indebted to the authors for a reprint of this very useful list. It was published during the year in the 'Transactions' of the Hertfordshire Natural History Society (vol. xiii. pt. iv. pp. 249-276). Except as regards the Pulicidæ, a list of which is contributed by the Hon. N. Charles Rothschild, a very large proportion of the species mentioned were obtained by Mr. Albert Piffard, who presented his collection of Diptera to the British Museum. In the matter of identification of the species the authors acknowledge much assistance from the Rev. E. N. Bloomfield and Mr. E. E. Austen.

The Genera of the Tortricidæ and their Types. By C. H. FERNALD, A.M., Ph.D. Pp. 1-68. Amherst, Mass.: Press of Carpenter and Morehouse. 1908.

AN exceedingly interesting and highly valuable compilation, commenced some twenty years ago and added to from time to time up to present date. The author, however, does not consider it yet complete, but he publishes it in the hope that any errors or omissions may be made known to him. Even as it is it will most certainly be of very great utility to everyone interested in this intricate subject.

Proceedings of the Hawaiian Entomological Society. Vol. i. pt. 5, with plate and text figures, pp. 163-210 (April, 1908); vol. ii. pt. 1, pp. 1-35 (October, 1908).

AMONG other matters of interest in pt. 5 are the following:—Presidential Address by W. M. Giffard, in the course of which he gives an account of the island of Lanai and its entomological fauna (pp. 176-184). "A List of the Described Hemiptera (excluding Aleyrodidæ and Coccidæ) of the Hawaiian Islands," by G. W. Kirkaldy (pp. 185-208, plate 4).

Broteria: Revista de Ciencias Naturales do Collegio de S. Fiel. Vol. vii. Serie Zoologica. Leipzig. THEODOR OSWALD WEIGER. 1908.

CONTENTS:—"Neurópteros de España y Portugal," por Longinos Navás (pp. 1-131). "Description d'un Aphidien nouveau de Portugal," par le Dr. G. Horváth (p. 132). "Contributio prima ad cognitionem Coccidologiae Regionis Zambezie (Mozambique, Africa Orientalis)," auctore Prof. J. S. Tavares. Plates ii. xvi.

I. A. R. I. 75.

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